1872ghbe.[pro].1441R

KG
11366
v.437

Fundamental Stars for Zones
From January 1, 1872 to July 7, 1872
B 5.

Charles W. Sever, University Bookstore, Cambridge.

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1872phae.proj.144mR

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1872phae.proj.1441R

Date Jan 1872 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder Ex. Therm. = log β =

Star.	× 13 α Orionis	× 14 α Aurigæ	35 Draco	× δ Virginis	× δ. Draco	× ε Virginis	× -54 Polaris	× (Sp 200K) 69 Hel. 6h20 May	+52 ε Bootis
	5 48 38.7	5 51	++	12 49	12 50	12 56	13 13	13h 13 23½	14 2 +7
T_δ	5 47 39.6	50 20.6	53 49.3	12 48	49 26.3	55 10.7	13 3 48.7	22 54.1	35
T_m	40.8	23.1	58.5		31.4	12.8	4 36.1	58.4	
T_e	43.0	25.7	54 7.8		36.9	14.9	6 3.2	2.6	
T_f	47.0	30.7	26.0	40.4	46.7	19.1	8 55.2	11.2	53.6
T_g	49.1	33.4	35.0	42.4	51.7	21.3	10 24.8 11 48.4	15.3	55.9
T_h	51.2	36.1	43.8	44.4	57.0	23.3	13 13.9	19.4	58.2
Sum	53.3	38.6	53.6	46.5	2.10	25.4	14 37.4	23.7	0.5
Mean	55.3	41.2	20.8	48.6	7.2	26.7	17 30.3	27.8	2.8
Red. to T_m	59.4	46.3	29.7		17.4	31.7	18 57.8	36.2	
Sum = s	1.6	49.0	38.7		27.2	33.8	20 22.9	40.5	
$\frac{1}{5}(T_m - T_s)$	37	51.5			27.3	36.0		44.6	
T	5 47 51.19	50 3602 54	53 44.17	48	49 56.92	55 23.25	13 11 47.15	23 22 19.44	14 38 58.20
RA	48 14.84	59.95	9.10				55.38		39 22.28
RA — T	+ 23.65		24.93				8.22		24.08
— n tang δ									
ΔT + m									

$T_m - T_\delta$

A

C

Sum

Mean

Red. for runs

Red. to hor. wire

Red. to meridian

Division error

Sum

Pointer

App. z

log a′

A′ log β

λ′ log γ

log tang z

log r

r

z

ϕ — z = δ (O)

δ (C)

δ (C — O)

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1872phae.proj.1441R

Date 1872 Jan. 1 Observer N. A. R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder Ex. Therm. = log β =

−,2 γ + 3,65 + ,87

Star. a^2 Librae. B Wrs. Min. B Bobs.

	XX	14 51	14 57	
T_δ	14 43 10.0	49	51.8	54 25.3
T_m	10.0	50	0.1	28.0
T_e	14.1		7.0	30.6
T_f	18.4	43	22.5	36.2
T_g	20.5	21	30.8	38.7
T_h	22.6	21	38.6	41.6
Sum	24.6	20	46.1	44.3
Mean	26.8	22	54.3	47.0
Red. to T_m	31.1	43 51	9.6	52.4
Sum = s	33.4		17.2	55.0
$\frac{1}{5}(T_m - T_s)$	35.5		25.1	58.0
T	13 43 22 64	50	38 46	54 41 55
RA	43 46.21	51	3 [illegible]	5,78
RA − T	23 57		25 [illegible]	2423
− n tang δ				
ΔT + m				

$T_m - T_\delta$	
A	
C	
Sum	
Mean	
Red. for runs	
Red. to hor. wire	
Red. to meridian	
Division error	
Sum	
Pointer	
App. z	
log a′	
A′ log β	
λ′ log γ	
log tang z	
log r	
r	
z	
ϕ − z = δ (O)	
δ (C)	
δ (C − O)	

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1872phae.proj.1441R

Date 1872 Jan 2 Observer WAP

n Recorder WAR.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	× B_2 α Androm	× B_2 22 Androm	× B_2 κ Cass	× Lb. χ Draco	× B_2 α Cass.
	0 2	0 4	0 26	12 28	★ 0, 33
T_δ	6.7 1 0.8 2	56.72 52.0 25	51.4 25	5.5 27 (0.11) 28	0.3 32 27.232 54.8
T_m	9.0 2.0	59.6 53.6	55.9	6.1 6.3	30.7
T_e	11.2 3.5 6.3	2.6 55.2 10.8	0.2	5.5 12.4	34.5
T_f	16.0 2.10	8.4 53.60	9.0	24.8	41.8
T_g	18.3	11.3	13.6	31.0	45.3
T_h	20.6	14.3	18.0	37.2	49.1
Sum	22.9	17.1	22.0	43.1	52.8
Mean	25.2	20.1	26.7	49.4	56.3
Red. to T_m	30.0	26.0	35.5	1.6	3.8
Sum = s	32.3	28.9	40.0	7.7	7.3
$\frac{1}{6}(T_m - T_s)$	34.7	31.8	44.3	13.7	11.1
T	22.6.9 20.63	1.56.8 14.25	19.6.6 17.87	407.3 27 3703	53.9.9 45.08
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	0 19.4	2 3.8	0 37.0	0 49.8	
C	1.3	44.9	16.8	23.8	
Sum				7.36	
Mean				0 36.80	
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	0	0	10	55	
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Jan 21 1872 Observer WAR Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder WAR. Ex. Therm. = log β =

Star.	β Androm.		γ Piscium		α Polaris			α Cass		
	1 3				1 13					
T_δ	1 53.6	1 44.7			16 58.0		1 20	43.0	21	1.8
T_m	56.1	45.6			18 23.0			48.5		2.6
T_e	58.6	47.0			19 47.8			54.2		2.0
T_f	3.6	17.3 45.7			11 13			6.2		
T_g	6.0				11 13.2 12.0 10.6	10.2 15.1		12.0		
T_h	8.6							17.8		
Sum	11.0					118		24.0		
Mean	13.6							29.7		
Red. to T_m	18.7							41.6		
Sum = s	21.2							47.6		
$\frac{1}{5}(T_m - T_s)$	23.7							53.4		
T	94.7 86.1				11 1393	11.93		198.0 180.0		
RA					11 56.00					
RA — T					42.07					
— n tang δ										
ΔT + m										
$T_m - T_\delta$										
A	1 54.6									
C	37.0									
Sum										
Mean										
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer	25									
App. z										
log a′										
A′ log β										
λ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

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1872phae.proj.144R

Date ~~Dec~~ Jan 2 1872 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder Ex. Therm. = log β =

	Star.	2 N Came				o Persei				S Persei			
		3 19				3 22				3 34			
T_δ		3	18	3	18 35.1			21	18.0	32	6.2	32	51.0
T_m					35.7				20.0		9.2		53.2
T_e				18	35.40				22.7 / 60.7		12.1		54.7 / 11.9
T_f			10.2					21	20.28		18.3	32	52.97
T_g			14.2		40						21.3		
T_h			18.3		41						24.3		
Sum			22.2		39						27.3		
Mean			26.3		41	21	14.6		8.48		30.4		
Red. to T_m			91.2 / 18.24				21.0	74	8.76		36.4		
Sum = s							24.0	30	8.70		39.5		
$\frac{1}{5}(T_m - T_s)$							27.0	30	8.64 / 8.65		42.5 / 26.75		
T		3	18	18.24				21		32	24.382		
RA													
RA — T													
— n tang δ													
ΔT + m													
$T_m - T_\delta$													
A		0	~~3.8~~ 56.2			1	9.0			1	0.4		
C		4	31.2				46.6				37.8		
Sum			87.4				115.6				98.7		
Mean		54	43.70			0	57.80			0	49.35		
Red. for runs													
Red. to hor. wire													
Red. to meridian													
Division error													
Sum													
Pointer		50	55				50				0		
App. z													
log a′													
A′ log β													
λ log γ													
log tang z													
log r													
r													
z													
ϕ — z = δ (O)													
δ (C)													
δ (C — O)													

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1872phae.proj.1441R

Date Jan 8 1872 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.A.R. Ex. Therm. = log β =

Star.	+ Polaris B2	+ − ν Ursæ B2	+ η Piscium B2	+ ν Persei B2	+ ζ Piscium B2
	1 13	1 18	1 25	1 30	1 35
T_δ	1 —	1 16 55.8	1 17 25.0	1 23 —	1 24 21.0	1 29 20.0	1 29 14.4	1 34 4.2
T_m	9 38.0	57.6	26.6	57.8	22.5	23.1	16.5	6.3
T_e	11 19	59.5	28.0	59.8	23.6	26.2	17.4	8.4
T_f	12 26.5	3.8	19.6 26.53	4.1	7.1 22.37	32.3	18.8 16.27	12.6
T_g	~~13 38.6~~	5.8		6.2		38.4		14.6
T_h	11 3.5	8.0		8.3		38.5		16.6
Sum	20	10.0		10.5		41.5		18.6
Mean	15	12.0		~~12.6~~		44.6		20.7
Red. to T_m		16.2		16.8		50.7		24.9
Sum = s		18.3		18.8		53.8		26.9
$\frac{1}{5}(T_m - T_s)$		20.4		21.0		56.9		29.0
T	11 2.33	17 7.92				42.8 0 38.45		18.5.8 16.62
RA	11 40.22	17 36.72						
RA — T	37.89	28.80						
— n tang δ								
ΔT +⁻m								
$T_m - T_\delta$								
A		3 56.2		2 42.8		4 59.0		
C		43.8		26.6		35.9		
Sum								
Mean								
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer		10		40		20		
App. z								
log a'								
A' log β								
λ log γ								
log tang z								
log r								
r								
z								
ϕ — z = δ (O)								
δ (C)								
δ (C — O)								

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1872phae.proj.144HR

Date June 1872 Observer N.H.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder N.H.R. Ex. Therm. = log β =

	+ B2 o Piscium	+ B2 g Camel	+ B2 ε Persei	+ B2 λ Tauri	+ B2 c Persei
	1 39	3 46	3 49	3 54	4 00
T_δ	37 56.0	37 50.8	3 45 19.63	45 1.6	48 30.7
T_m	58.1	51.9	23.8	3.1	33.3
T_e	0.1	52.9	27.8	4.9	35.9
T_f	4.3	51.87	3.61	5.20	41.4
T_g	6.3		4.04		44.0
T_h	8.5		44.9		46.7
Sum	10.6		49.0		49.3
Mean	12.6		53.2		52.1
Red. to T_m	16.7		1.5		57.3
Sum = s	18.7		5.8		0.1
$\frac{1}{5}(T_m - T_s)$	20.8		10.1		29
T	92.7 8.48		492.2 44.75		513.7 46.70
RA					
RA — T					
— n tang δ					
ΔT + m					

	+ B2 o Piscium	+ B2 g Camel	+ B2 ε Persei	+ B2 λ Tauri	+ B2 c Persei
	1 39	3 46	3 49	3 54	4 00
$T_m - T_\delta$					
A	2 15.6	4 58.0	0 48.4	1 4.1	2 5.2
C	59.0	33.0	26.3	48.0	42.1
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	50	35	45	15	0
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Jan 8 1872 Observer NAR Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder NAR Ex. Therm. = log β =

Star.	+ L B2 ζ Tauri	× B2 1 Camelop.	× Jan-8-9 β Ursæ Min	× 6.7 β Bootis
	4 13	4 22	14 57	14 57
T_δ			14 48 36.2 +10.0	14 56 10.3 +10.0
T_m			49.7	12.5
T_e			52.7	15.4
T_f			50 7.6	20.7
T_g			15.6	22.3
T_h			22.5	26.3
Sum			31.1	29.1
Mean			35.0	32.1
Red. to T_m			42	37.5
Sum = s			51 2.3	33.7
$\frac{1}{5}(T_m - T_s)$			9.4	4.28
T			23.12	5
RA			14 58 23.07	56 26.28 +10 36.25
RA — T			51 4.25	57 6.13
— n tang δ			31.18	+29.91
ΔT +m				- 43
				+29.48

0 = -31.18 +2.65

0 = 25.91 + .87

n = +4.9

$T_m - T_\delta$	
A	
C	
Sum	
Mean	
Red. for runs	
Red. to hor. wire	
Red. to meridian	
Division error	
Sum	
Pointer	
App. z	
log a'	
A' log β	
λ' log γ	
log tang z	
log r	
r	
z	
φ — z = δ (O)	
δ (C)	
δ (C — O)	

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1872phae.proj.1441R

Date 1872 Jan. 9. morning. Observer Barom. = log B =

Att. Therm. = log T = log γ

n Recorder Ex. Therm. = log β =

Star.	× Polaris	× η Bootis	× α Draco.	× β Bootis	δ Bootis	5 Ursa Min.	ε Bootis	α2 Librae	β Ursa Min.
		35	2.14	36	130	4,09	52	−28	360
	13 13 0.2	h 13 49	14 1	h 14 10	14 21	××	×?	××	14 57
T_δ	13 3 58.9 6 12.2	13 47 51.1	59 54.2	9 4.9	20 56.0 26	23.8	38 38.2	43 3.7	49 45.7
T_m	4 30.0 14 5 9.7	53.2	59.0	7.0	1.4	32.4	40.5	5.8	53.5
T_e	5 57.5	55.4	3.7	9.2	4.9	41.2	42.9	6.8	50 1.3
T_f	8 46.5	59.7	13.6	13.6	11.6	58.7	47.5	12.1	17.0
T_g	10 11.7	1.8	18.4	15.8	14.9 27	7.0	49.6	14.2	24.6
T_h	− 11 38.9	4.0	23.3	18.0	− 18.4	15.8	52.1	16.5	32.4
Sum	13 3.2	6.2	28.2	20.2	24.8	24.2	54.3	18.6	40.4
Mean	14 31.1	8.3	33.0	22.3	25.1	32.8	56.6	20.8	47.6
Red. to T_m	17 20.6	12.8	42.8	26.6	31.9	50.4	1.2	24.9	51 3.7
Sum = s	18 47.9	14.8	47.7	28.8	35.3	59.2	3.6	27.0	11.5
$\frac{1}{5}(T_m - T_s)$	20 11.7	17.0	52.5	31.0	38.6	67.9	5.9	29.1	19.2
T	11 38.12	48 4.03	0 23.31	9 17.95	20 18.36	27 15.76	38 52.04	43 16.41	50 32.45
RA	11 46.59	34.40	54.54	48.26	49.14	47.95	22.54	46.47	4.33
RA − T	10.47	30.37	31.23	30.31	30.78	32.19	30.50	30.06	31.88
− n tang δ									
ΔT + m									

$T_m - T_\delta$									
A	3 19.3	3 2.2							
C	51.8	33.8							
Sum	11.1	96.0							
Mean	3 5.55	2 48.00							
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	0	0							
App. z									
log a′									
A′ log β									
λ′ log γ									
log tang z									
log r									
r									
z									
ϕ − z = δ (O)									
δ (C)									
δ (C − O)									

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1872phae.proj.1444R

Date Jan 10 1872 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.A.R. Ex. Therm. = log β =

Star.	+ γ Persei B2	+ 47 Cephei B2	+ β Persei	+ α Persei B2
T_δ	2 44 44 38.3	45 16.2 47 0.9	14 51 51 29.4	54 52.2 54 50.0
T_m		27.3 8.2		54.0 50.5
T_e		38.1 12.4		56.2 50.25
T_f	83.2	48.5 21.5 7.17		0.1
T_g	36.5	59.3		2.2
T_h	39.9	208		4.5
Sum	43.3	82.0	50 42.9 35.10	6.6
Mean	46.9	42.6	50.7 7.8 4.58 35.10	8.5
Red. to T_m		34.2	6.5 7.2 35.30	12.6
Sum = s		44.7	18.7 8.3 34.70	14.7
$\frac{1}{5}(T_m - T_s)$		55.6	22.0 35.20 .40	16.7
T	39.96	21.75	50 35.08	4.39
RA				
RA — T				
— n tang δ				
ΔT ± m				
$T_m - T_\delta$				
A	4 46.1	4 35.0	1 12.6	2 40.3
C	28.7	13.2	48.7	29.1
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	5	25	5	45
App. z				
log a′				
A′ log β				
λ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.144TR

Date Jan 10 1872 Observer Z.R.K.

n Recorder Y.N.P.

Barom. = Att. Therm. = Ex. Therm. =

log B = log T = log β = log γ

Star.	× B2 ζ Persei	× B2 β Persei	× B2 48 Cep. N6	× 1 Camelop.	× B2 α Tauri
T_δ	2 57 2 56 - 56 37.0	3 0 59 3.2 58 51.8	3 5 3 2 42.0 2 34.1	4 22 4 21	4 29 ~~20~~ ~~55.6~~ 4 27 51.0 27 39.0
T_m	-	6.0 53.7	51.5 34.8	~~58.3~~	53.1 40.6
T_e	-	8.7 55.3 10.8	0.7 35.8 14.7	~~60.5~~	55.4 42.0 12 8.6
T_f	-	14.2 5360	19 4 3490		59.6 4120
T_g	-	16.8	28.8		1.8
T_h	27.4	19.4	38.4		3.8
Sum	30.0	22.2	47.5		6.0
Mean	32.6	25.0	56.7		8.2
Red. to T_m	37.9	30.3	15.6		12.4
Sum = s	40.5	33.1	24.8		14.6
$\frac{1}{5}(T_m - T_s)$	43.2	35.7	33.9		16.6
T		19.51	38.06		3.86
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	3 25.6	0 45.5	3 33.7		2 38.6
C	11.1	31.6	13.0		45.8
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	10	55	5		5
App. z					
log a′					
A′ log β					
λ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Jan 10 1872 Observer W.H.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.H.R. Ex. Therm. = log β =

Star.	B2 + 4 Camel	B2 + 9 a Camel	B2 + i Aurigæ	B2 + 10 Camel
	4 38	4 42	4 49	4 52
T_δ	4 36 27.6 36	15.1 40 19.4	47 54.2 47	44.0 51 6.7 50 45.3
T_m	31.4	17.2 24.3	56.5	45.5 10.8 48.0
T_e	35.0	19.3 29.3	58.9	47.1 15.0 51.4
T_f	42.5	21.6 17.20 39.5	3.8	16.6 45.53 23.3 14.47 48.23
T_g	46.2	44.6	6.3	27.1
T_h	50.0	49.6	8.8	31.5
Sum	53.6	54.8	11.2	35.6
Mean	57.3	—	13.7	39.8
Red. to T_m	4.7	10.1	18.6	48.4
Sum = s	8.7	14.9	21.0	52.4
$\frac{1}{5}(T_m - T_s)$	12.2	20.2	23.5	56.6
T	49.93		8.77	31.56
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	2 9.8		0 39.9	3 38.2
C	50.2		25.0	20.0
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	50		25	5
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date Jan 10 1872 Observer WAR Barom. = log B =

n Recorder WAR Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	† ε Aurigae	† ε Urs Min	† ω Aurigae	† α Aurigae	† Polonis
	B2	B2	B2	B2	B2
T_δ	4 52 — 52	40.5 4 57 3.55 10	14.25 3 53.83	45.4 6 25.56	48.37 40.5 7 36.1
T_m	— 41.8	19.4	15.3 56.5	46.8 28.6	42.6
T_e	— 43.8	34.3	17.0 59.1	48.6 31.6	44.7
T_f	— 52 42.03	5.0	15.5 4.3	46.93 37.5	48.8
T_g	13.7 16.55	20.0	6.9	40.4	58.9
T_h	16.5 16.50	35.6	7.5	43.4	53.0
Sum	19.4 16.55	51.0	12.1	46.4	55.0
Mean	22.2 16.50	66.2	14.7	49.1	57.1
Red. to T_m	27.8 16.40	36.2	20.0	55.1	61.2
Sum = s	30.7 16.45	51.8	22.6	58.1	63.4
$\frac{1}{s}(T_m - T_s)$	33.6 16.50	66.9	25.2	60.0	65.5
T	4 52 16.49	35.45	9.52	43.25	52.97
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	1 2.8	4 41.6	3 39.8	2 11.1	3 27.2
C	11.0	18.5	24.0	55.0	19.0
Sum	13.8				
Mean	1 6.90				
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	45	35	0	30	40
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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Date Jan 10-11 "morning" Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder Ex. Therm. = log β =

Star.	† Polaris		† ζ Virginis		† π Ursæ Maj	† π Bootis	† α Draco
	13 3		13 28		13 43	13 49	14 1
T_δ	18 2 57.4	6 16.3	27 26.0	27 26.0	41 38.3	47 50.3	59 53.5
T_m	4 23.8		28.1	28.1	41.4	52.4	58.1
T_e	5 48.8	14 45.6	30.3		44.6	54.6	2.9
T_f	8 40.5		34.3		51.2	58.9	12.8
T_g	10 8.6		36.3		54.2	1.0	17.6
T_h	11 32.0 12 58.8		38.3		57.5	3.2	22.4
Sum	14 27.0		40.3		0.5	5.4	27.4
Mean	17 19.1		42.4		3.8	7.6	32.0
Red. to T_m	18 43.6		46.6		10.3	12.0	41.9
Sum = s	20 10.6		48.6		13.4	14.2	47.1
$\frac{1}{5}(T_m - T_s)$			50.7		16.6	16.3	51.6
T	11 33.65		27 38.35		41 57.44	48 3.26	0 22.48
RA	11 47.62		9.37		28.88	34.44	54.50
RA — T	13.97		31.02		31.44	31.18	32.12
— n tang δ							
ΔT + m							
$T_m - T_\delta$							
A	3 20.9	3 2.0					
C	54.8	35.9					
Sum	15.7	97.9					
Mean	3 7.85	3 48.95					
Red. for runs							
Red. to hor. wire							
Red. to meridian							
Division error							
Sum							
Pointer	0	0					
App. z							
log a′							
A′ log β							
λ′ log γ							
log tang z							
log r							
r							
z							
ϕ — z = δ (O)							
δ (C)							
δ (C — O)							

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1872phae.proj.1441R

Date Jan 10-11 Observer Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder Ex. Therm. = log β =

Star. † a Bootis † θ Bootis ζ Ursæ Min. ξ Bootis α₂ Librae † β Ursæ Min.

		14	10		14	21												14	51			
T_δ	9		4.1	19		57.5	26		23.6	38		37.5	43		3.0	49		44.7				
T_m			6.2			0.8			32.2		86	39.8			5.0			53.0				
T_e			8.4			4.1			40.8		86	42.0			7.1		50	0.8				
T_f			12.8			10.8			57.8		170	46.7			11.4			16.1				
T_g			14.9			14.3	27		6.4		86	48.9			13.6			24.1				
T_h			17.0			17.7			15.1		87	51.3			15.7			31.8				
Sum			19.3			21.1			23.4		83	53.6			17.8			39.5				
Mean			21.5			24.4			32.0		86	56.0			19.9			47.2				
Red. to T_m			25.8			31.0			49.5		175	60.6			24.1		51	3.0				
Sum = s			28.0			34.4			58.3		88	62.7			26.3			10.9				
$\frac{1}{5}(T_m - T_s)$			30.3			37.8			66.9		86	65.2			28.4			18.8				
T	9		17.12	20		17.63	24		15.09	38		51.30	43		15.66	50		31.81				
RA			4882			4919			48.04			2258			4657			4.44				
RA — T			31.49			31.56			32.77			31.28			30.85			32.63				
— n tang δ																						
ΔT + m																						

$T_m - T_\delta$																						
A																						
C																						
Sum																						
Mean																						
Red. for runs																						
Red. to hor. wire																						
Red. to meridian																						
Division error																						
Sum																						
Pointer																						
App. z																						
log a′																						
A′ log β																						
λ′ log γ																						
log tang z																						
log r																						
r																						
z																						
φ — z = δ (O)																						
δ (C)																						
δ (C — O)																						

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1872phae.proj.1441R

Date Jan 11-12 Observer Z.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder Ex. Therm. = log β =

Star.	† morning. Polaris	† ζ Virginis	† η UrsaMaj.	† η Boötis	† α Draco	† α Boötis	† δ Boötis
	13 13	13 28	13 43	13 49	14 1	14 40	14 21
T_δ	13 8 40.3	27 C. 37.6	41 37.60 37.5	47 49.5	59 53.0	9 3.4	20
T_m	10 6.6	39.7	21 .64 40.8	51.7	57.8	5.5	
T_e	11 31.4	41.8	21 .68 44.0	53.8	2.7	7.8	
T_f	12 59.9	45.9	41 .66 .70 50.4	58.1	12.4	12.1	10.3
T_g	14 24.0	48.0	21 .74 53.5	04	17.2	14.3	13.5
T_h		50.1	21 56.8	26	22.3	16.5	17.2
Sum		26.33	59.8	4.7	27.0	18.6	20.5
Mean		43.89	3.1	2.0	31.5	2.8	2.38
Red. to T_m		6.13	9.6	11.3	41.6	25.2	
Sum = s			12.7	13.4	46.5	27.4	
$\frac{1}{5}(T_m - T_s)$		27 37.66	15.8	48 15.6	51.3	29.5	
T	11 32.44	37.76	41 56.73	47 2.55	0 22.12	9 16.46	20 17.06
RA	46.62	5.40	28.93	34.47	54.66	48.32	49.20
RA — T	14.18	31.64	32.20	31.92	32.54	31.87	32.14
— n tang δ							
ΔT + m							

$T_m - T_\delta$				
A	3 13.6	2 58.6		
C	49.8	34.0		
Sum	3.4	92.6		
Mean	3 1.70	2 46.30		
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	0			
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872

Date Jan 11-12 Observer

n Recorder

Barom. = Att. Therm. = Ex. Therm. =

log B = log T = log β = log γ

Star. ε Bootis α Librae β Ursæ Min

	?					14	57		
T_δ	38	36.7	43	2.250					
T_m		39.0		4.3					
T_e		41.3		6.5					
T_f		46.0		10.7		15.7			
T_g		48.2		12.9		23.7	80		
T_h		50.6		15.1		31.4	77		
Sum		53.0		17.1		39.2	78		
Mean		55.3		19.2		46.9	77		
Red. to T_m		59.8		23.5		31.38			
Sum = s		62.2		25.7					
$\frac{1}{5}(T_m - T_s)$		64.6		27.8					
T	38	30.61	43	15.00	80	31.38			
RA		2261		46.54		4.52			
RA — T		2200		31.54		33.14			
— n tang δ									
ΔT + m									

$T_m - T_\delta$	
A	
C	
Sum	
Mean	
Red. for runs	
Red. to hor. wire	
Red. to meridian	
Division error	
Sum	
Pointer	
App. z	
log a′	
A′ log β	
λ log γ	
log tang z	
log r	
r	
z	
ϕ — z = δ (O)	
δ (C)	
δ (C — O)	

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1872phae.proj.1441R

Date Jan 12 1872 Observer A. M. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder A. M. Ex. Therm. = log β =

Star.	B2 † τ Persei		B2 † γ Persei		B2 † β Persei		B2 † λ Tauri	
	2 45		2 56		3 00		3 54	
T_δ	2 45	45	26.0 55	8.2 54	57.7 59	31.1 59	17.03 53	20.1 53 18.1
T_m			27.5	11.6	59.5	33.8	18.7	22.2 18.9
T_e			29.1 22.6	15.0	61.5 178.7	36.6	20.5 56.2	24.2 19.6 26.6
T_f		1.3	27.53	21.7 54	57.57	41.9	18.73	28.5 18.5
T_g		4.5		25.1		44.6		30.5
T_h		8.0		28.7		47.3		32.6
Sum		11.4		32.1		50.1		34.8
Mean		14.8		35.5		52.7		36.9
Red. to T_m				42.3		58.8		41.1
Sum = s				45.8		0.8		43.2
$\frac{1}{5}(T_m - T_s)$				49.3		3.6		45.3
T		8.00	55	28.66		47.38 9		35 9.4 32.67
RA								
RA — T								
— n tang δ								
ΔT + m								
$T_m - T_\delta$								
A	0	1.8	3	23.8	0	39.2	0	26.0
C		46.5		8.8		26.9		15.2
Sum				32.6				
Mean			3	16.30				
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer	10		20		58		15	
App. z								
log a′								
A′ log β								
λ′ log γ								
log tang z								
log r								
r								
z								
ϕ — z = δ (O)								
δ (C)								
δ (C — O)								

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1872phae.proj.1441R

Date Jan 21 1872 Observer A. M. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder A. M. Ex. Therm. = log β =

Star.	† c Persei B2	† γ Tauri B2	† δ Tauri	† ε Tauri B2
	4 00	4 13	4 16	4 21
T_δ	3 59 41,1 5 8	52,7 4 12 15,0 4 12 5,5	15 17,5 15 12,6	20 52,8 20 43,6
T_m	4,2	54,1 17,1 6,7	19,6 13,7	55,0 45,0
T_e	7,2	55,8 19,3 8,10	21,8 15,0	57,1 46,6
		12,6 20,2	11,3	15,4
T_f	13,3	54,20 23,6 6,73	26,2 15 13,77	1,5 45,13
T_g	16,4	25,7	28,3	3,5
T_h	19,4	27,8	30,5	5,8
Sum	22,5	29,8	32,6	8,0
Mean	25,5	32,0	34,7	10,2
Red. to T_m	31,6	36,2	39,0	14,4
Sum = s	34,7	36,4	41,2	16,7
$\frac{1}{5}(T_m - T_s)$	37,7	40,6	43,5	18,8
	2 13,6	30 35	33 4,9	63,8
T	19,42	27,78	15 30,45	5,70
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	1 27,1	3 58,2	3 40,3	4 22,3
C	9,3	47,9	29,7	12,4
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	0	0	5	4,5
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date 1872 Jan. 24. Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	† β Androm.	† Polaris	† 41 Aurigæ B2	† ι Persei	† β Trianguli B2
T_δ	1 2 12.1	1 2 7.5	1 13 2 43 2 42 7.1 42	0.32	2 45 44 44.8 44 36.1	14 51 50 — 51 54.4
T_m	14.5	8.7	4 0.6 260	9.3	1.1	48.4	38.0	22.4	59.7
T_e	17.0	9.7	8 30.4 298	11.7	2.6	51.7	40.5	30.6	64.2
T_f	22.0	25.9 8.57	8 23.0 526	16.3	4.0 1.33	58.3	44 8820	45.6	67.3 5.6
T_g	24.5	2 8.68	9 49.0 260	18.7	1.6	53.3	52 18.7
T_h	27.0		11 14.5 255	20.9	5.0	59.3
Sum	29.5		12 41.9 274	23.2	8.3	9.1
Mean	32.0		14 8.3 234	25.4	11.7	17.0
Red. to T_m	37.1		16 59.5 542	30.0	18.3	32.4
Sum = s	39.7		18 26.1 266	32.3	21.6	40.0
$\frac{1}{5}(T_m - T_s)$	42.1		19 51.1 250	34.6	25.0	48.0
T	1 2 27.04		11 14.8	20.86	45 49.8 5-4.8
RA			11 36.29
RA — T			- 22.11
— n tang δ	
ΔT + m	
$T_m - T_\delta$	
A			4 24.6	4 29.5	1 12.8
C			53.0	58.2	33.9
Sum				27.7	6.7
Mean				4 13.85
Red. for runs	
Red. to hor. wire	
Red. to meridian	
Division error	
Sum	
Pointer			3 5	5	5
App. z	
log a'	
A' log β	
λ' log γ	
log tang z	
log r	
r	
z	
ϕ — z = δ (O)	
δ (C)	
δ (C — O)	

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1872phae.proj.14415

Date Jan 24 1872 Observer W.A.R.

n Recorder W.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T = _____ log γ
log β =

Star.	× B2 ρ Persei	× B2 α Persei	× B2 716 Gr.	× o Aurigae	× ζ Aurigae
	2 57	3 15	3 31	α 5 36	5 43
T_δ	2 56 36.856	25.0 3 14 46.2 14	54.3 30 30.6 30	6.1 5 35 34.6 35	36.0 42 15.7 42 0.5
T_m	39.3	26.5	56.3 35.0	6.8 37.9	38.3 18.4 2.2
T_e	42.0	28.0 19.5	57.7 18.3 39.5	9.6 41.0	39.8 24.1 21.0 3.6 6.3
T_f	47.1	26.50 58.9	56.10 48.6	12.0 34.5 47.3 35	38.03 26.4 42 2.10
T_g	49.7	2.1	53.0	8.62 50.5	29.0
T_h	52.4	5.3	57.4	53.6	31.7
Sum	55.0	8.3	1.8	56.8	34.4
Mean	57.7	11.5	6.5	0.1	37.0
Red. to T_m	62.8	17.9	15.5	6.4	42.3
Sum = s	65.5	21.0	19.9	9.6	44.9
$\frac{1}{s}(T_m - T_\delta)$	6.8.1	24.1	24.8	12.8	47.6
T	576.4 52.40	15 522	57.44	35 59.06 53.69	42 348.4 31.67
RA		11.09			
RA — T		5.87			
— n tang δ					
ΔT + m					

$T_m - T_\delta$					
A	2 57.8	4 41.3	0 50.6	2 57.0	1 55.0
C	21.0	7.8	15.2	14.9	21.2
Sum				65.9	76.2
Mean				2 32.95	1 38.10
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	0	35	35	35	15
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Jan 24 1872 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.A.R. Ex. Therm. = log β =

Star.	† ν Aurigæ	† ο Aurigæ	ν Eridani	ε Leporis
	5 49	5 57	† †	† †
T_δ	5 48 32.95	48 15.2 50 38.7	50 30.4 4 30 15.4	5 0
T_m	86.4	17.4 41.3	32.2 17.8	
T_e	39.9	19.7 43.8	34.0 20.2	
T_f	47.0	22.3 48 17.43 44.0 50 22.20	24.8	
T_g	50.4	54.5	27.3	
T_h	54.0	54.2	29.7	
Sum	57.4	56.7	32.4	
Mean	1.0	59.4	34.5	
Red. to T_m	8.1	4.5	39.3	
Sum = s	11.5	7.1	41.7	8.9
$\frac{1}{5}(T_m - T_s)$	15.0	9.4	44.0	11.1
T	59 3.6 48 53.96	59 5.5 50 54.14	32.6.8 30 29.71	
RA				
RA — T				
— n tang δ				
ΔT + m				

υ = −5.87 +1.17

υ = 22.11 + 41.81

16.34 40.64

n = 7.40

$T_m - T_\delta$				
A		2 2.37	1 26.0	
C		4.86	5.32	
Sum		7.23	7.92	
Mean i		2 3.615	1 3.960	
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	5	10		
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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Date Jan 31 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = log γ

Ex. Therm. = log β =

	Star.	+ Polaris	+ α Arietis	+ δ Persei	+ ε Persei	+ γ Tauri	+ 1 Camel
			B2	B2	B2	B2	B2
		13 13	2 00	2 5	4 00	4 13	4 22
T_δ			1 59 36.359	23,0 2 4 38.04	30.5 3 58 66.558	51.4 4 12 10.7	4 21 24.5 25.4 | 21 43.3
T_m			38.4	239 41.2	31.4 59.6	52.6 12.8	28.1 29.0
T_e			40.7	25.0 44.5	32.4 26	53.7 15.0	31.4 32.4
T_f			45.2	11.9 2397 60.9	4.3 31.43 8.6	54.8 19.1	38.4 39.4
T_g			47.4	54.2	11.7	12.5 53.12 21.3	41.9 42.8
T_h			49.7	57.5	14.8	23.5	45.5 46.2
Sum			51.8	0.6	17.8	25.6	49.0 49.7
Mean			54.0	3.7	20.9	27.7	52.2 53.2
Red. to T_m		16 43.2	10 58.4 58.6	10.3	26.9	31.8	59.1 0.1
Sum = s		18 13.0	11 2.0 0.7	13.6	29.8	34.0	2.6 3.7
$\frac{1}{5}(T_m - T_s)$		19 38.3	11 1.2 3.0	16.8	33.0	36.3	6.2 7.0
T		11 0.50	49.62	4 57.39	14.75	23.43	45.35 46.26
RA							
RA — T							
— n tang δ							
ΔT + m							
$T_m - T_\delta$							
A			2 32.0	1. 0.0	1 58.0 4	4 54.5	1 57.3
C			1.0	0 24.1	24.0	17.3	23.0
Sum							
Mean							
Red. for runs							
Red. to hor. wire							
Red. to meridian							
Division error							
Sum							
Pointer			30	55	0 0	0	45
App. z							
log a′							
A′ log β							
λ log γ							
log tang z							
log r							
r							
z							
ϕ — z = δ (O)							
δ (C)							
δ (C — O)							

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1872phae.proj.1441R

Date Jan 31 1872 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.A.R. Ex. Therm. = log β =

Star.	+ o Aurigae B2	+ L Aurigae B2	+ a Orionis B2	+ β Aurigae B2
	5 36	5 43	5 48	5 50
T_δ	5 35 33.0 35	15.8 42 14.3 42	6.0 47 35.5 47	53.1 49 43.8 49 31.3
T_m	36.1	17.0 16.9	7.9 57.6	54.3 46.8 33.4
T_e	39.2	18.3 19.5	13.9 59.6	55.8 49.7 34.6
T_f	45.6	21.1 24.7	6.5 3.8	13.2 54.40 53.6 2.3 52.10
T_g	48.8	17.03 27.4 36.2	5.8	56.5
T_h	52.0	32.7	7.9	1.5
Sum	53.1	35.5	16.2	4.8
Mean	58.5	40.7	12.1	7.2
Red. to T_m	4.7	4.25	16.3	13.2
Sum = s	7.9	46.0	18.4	16.1
$\frac{1}{5}(T_m - T_s)$	11.3	831.4	2.014	18.9
T	57 2.2 52.92	30.13	7.96	15.16 1.42
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$	3 14.3	2 32.2	0 26.5	3 18.3
A	2 40.7	1 59.1	−1.6	2 44.2
C				
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	35	15	0	25
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date Jan 31 Observer W.R. Barom. = log B =
Att. Therm. = log T = log γ
n Recorder W.D.R. Ex. Therm. = log β =

Star.	+ 22 Camel Bz	+ 5 Hya Bz	+ 51 Eph. Bz	ν Gem	ε Lep
T_δ	6 4	6 3 58.1 9 56.8 18 13	6 35 26.8 6 41	32 18.4 30 xx	4 59 43.0
T_m		60.8 10 30.6	36 11.0	17.5	45.2
T_e		63.6 11 7.0	26 53.2		47.4
T_f	25.0	12 16.7	38 19.8	23.6	51.5
T_g	31.6	12 52.3	39 2.3	25.8 22	54.1
T_h	37.5	13 25.0	39 44.5	28.4 26	56.3
Sum	43.7	14 1.0	40 26.1	30.6 22	58.6
Mean	49.2	14 36.0	41 11.2	33.0 24	0.8
Red. to T_m	18.70 37.40	15 42.0	42 35.4	141.4 31 28.28	3.2
Sum = s		16 19.6	43 18.7		7.4
$\frac{1}{5}(T_m - T_s)$		16 54.5	44 1.0		9.7
T		281.5 13 25.59	290.0 39 44.55		619.6 59 56.33
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	2 2.38	1 12.6	0 5.20		
C	1 46.0	32.5	11.4		
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	0	0	10		
App. z					
log a′					
A′ log β					
λ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Feb. 1 1872 Observer W. A. R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.A.R. Ex. Therm. = log β =

Star.	× 6 Persei	× B2 S Arietis	× B2 a Persei	× B2 S Persei
	2 5	3 4	3 3 15	3 34
T_δ		3 3 57.4 3 3 48.1	14 44.0 14	36 9 3 33 22.3 3 3 31.0
T_m		59.6 49.0	47.1	38.3 25.5 32.8
T_e		1.8 50.0	5 0.1	39.0 28.4 33.8
T_f		6.2 1471 4903	56.5	24.2 38.07 34.7 32.53 7.6
T_g		8.4	59.8	37.6
T_h		10.6	2.8	40.6
Sum		12.7	6.0	43.6
Mean		14.9	9.3	46.7
Red. to T_m		19.3	15.6	52.8
Sum = s		21.4	18.7	55.8
$\frac{1}{5}(T_m - T_s)$		23.7	21.9	58.8
T		17 6.0	31.8	446.8
RA		10.53	289	40.62
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	1 1.5	4 17.3	4 6.58	1 17.9
C	28.2	3 50.6	22.0	0 45.4
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	53	5	55	0
App. z				
log a′				
A′ log β				
λ log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date Feb. 1 1872 Observer W. H. R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W. H. R. Ex. Therm. = log β =

	× B2 # 2 Camel	× ½ Persei B2 ζ Ursæ Min	B2 × 1 Camel	B2 × β Aurigæ	B2 × 22 Camel.
Star.	3 46	? 3 51	4 22	5 50	6 0 6 5
T_δ	3 45 40.0	3 45 32.0 / 3 47 34.4	3 48 24.7	4 21 24.8 / 4 21 19.7	5 49 43.2 / 5 49 40.8	4 2.0 / 3 28.8
T_m	44.3	34.7 / 44.7	10.3 27.5	28.4 / 21.0	46.2 / 41.8	7.5 / 32.0
T_e	48.5	38.6 / 55.0	10.3 31.5	31.6 / 21.7	49.1 / 42.4	13.4 / 34.7
T_f	57.3	15.3 / 3570 48 14.8	9.8 83.7 2790	38.9 / 2080	54.9 / 41.83	5.5 / 25.6 / 95.3 31.83
T_g	1.3	24.5	9.7	42.1	57.8	30.9
T_h	5.6	34.2	9.7 10.5	45.6	0.7	36.6
Sum	9.8	44.7	10.7	49.2	3.5	42.8
Mean	13.8	55.4	24.8	52.6	6.5	46.6
Red. to T_m	22.3	15.0	10.5	59.5	12.3	0.5
Sum = s	26.6	25.5	9.7	2.7	15.3	5.8
$\frac{1}{5}(T_m - T_s)$	30.7	35.2		6.6	18.2	12.0
T	6.0 46 54.7	38 3.4		502.0 4564	7.7 50 0.70	40.3.7 5 36.70
RA		48 34.85				
RA — T						
— n tang δ						
ΔT + m						
$T_m - T_\delta$	0 25.5	1 32.4	1 22.0	3 8.4	2 56.0
A	51.0	54.0	0 48.2	2 38.8	18.5
C		8.64			
Sum		1 43.20			
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	40	35 45	45	25	0
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Feb. 1 1872 Observer W.H.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.H.R. Ex. Therm. = log β =

Star.	+ 2 Lyncis		+ S. Ursæ Min.		+ 57 Cephei		+ 8 Lyncis		+ 57 Aurigæ	
	6 9		18 13		6 41		6 26		6 36	25
T_δ	6 7 48.1	7 24.3		6 17 8.8	6 35 24.9	6 32 34.0	6 25 25.8	25 6.3	6 29 23.8	14.8
T_m	32.0	47.6	10 30.6		36 8.4		30.3	7.0	26.8	16.2 17.7
T_e	36.0	48.8	11 6.0		36 50.8		34.4	8.3	27.2	18.7
T_f	43	50.5	12 14.8		38 16.3		43.2	11.6	34.6	29 16.23
T_g	8.2	192.2 7 48.05	12 49.1		39 1.5		47.7	33.2 25 8.30	37.3	
T_h	12.0		13 24.4		39 43.8		51.8		38.9	
Sum	16.0		13 59.3		40 24.7		56.3		42.8	
Mean	20.0		14 33.0		41 7.1		0.6		45.2	
Red. to T_m	28.0		15 43.7		42 35.1		9.1		50.6	
Sum = s	32.1		16 18.4		43 1.50		13.5		53.2	
$\frac{1}{5}(T_m - T_s)$	36.2		16 52.9		43 59.6		17.7		53.8	
T	132.9 8 12.18				46.7.2 39 42.47		57 0.4 25 51.85		43.91 6 29 8.92	
RA										
RA — T										
— n tang δ										
ΔT + m										
$T_m - T_\delta$										
A	1 3.2		0 41.2		0 48.5		4 5.4		4 1.0	
C	0 24.9		0 1.3		7.7		3 29.0		3 27.6	
Sum	8.79						94.4		8.86	
Mean	0 43.95						3 47.20		3 44.30	
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer	20		0		10		43		50	
App. z										
log a′										
A′ log β										
λ log γ										
log tang z										
log r										
r										
z										
ϕ — z = δ (O)										
δ (C)										
δ (C — O)										

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1872phae.proj.1441R

Date Feb. 24 1872 Observer A. M.

n Recorder A. M.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T = _____ log γ
log β =

	B2 α Aquilae	B2 β Aquilae	B2 22 Camel
	5 48	5 50	6 5
T_δ	5 47 54.2	5 47 49.5 5 50 12.3	6 4 1.3 6 3 44.4
T_m	56.3	50.4 13.6	7.2 46.0
T_e	58.4	51.3 15.2	12.8 50.0
		1.2 11.1	14.04
T_f	2.5	50.40 49 54.4 13.70	24.7 46.80
T_g	4.5	57.3	30.5
T_h	6.6	60.2	36.2
Sum	8.7	63.1	42.6
Mean	10.4	66.0	48.0
		1.4	
Red. to T_m	15.0	50 0020	59.8
Sum = s	17.2		5.5
$\frac{1}{5}(T_m - T_s)$	19.3		11.6
			40 0.2
T	6.6		36.38
RA			
RA — T			
— n tang δ			
ΔT + m			
$T_m - T_\delta$			
A	0 30.2	2 37.3	2 56.0
C	4.0	4.9	18.5
Sum			
Mean			
Red. for runs			
Red. to hor. wire			
Red. to meridian			
Division error			
Sum			
Pointer	0	25	0
App. z			
log a′			
A′ log β			
λ′ log γ			
log tang z			
log r			
r			
z			
ϕ — z = δ (O)			
δ (C)			
δ (C — O)			

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1872phae.proj.1441R

Date Feb. 4 1872 Observer A. M. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder A. M. Ex. Therm. = log β =

Star.	+ 47 Ceph. H	+ β Persei	+ 48 Ceph.	+ α Persei	+ 2 Lynei
	B2		B2	B2	
	2 50	3 00	3 5	3 15	6 9 7
T_δ	2 48 52.7	2 48 27.8	2 58 24.6 5 5 15.4	3 3 1.9 3 3 31.0	3 15 42.5 3 15 31.2 6 7 46.8 36.3
T_m	49 4.1	30.2	27.3	11.1 34.9	45.7 32.8 38.1
T_e	14.5	33.4	30.0	20.3 39.2	48.6 34.9 40.7
T_f	36.2	9 1.4 30.47	35.5	39.2 15.1 35.73	55.3 32.97 28.7 114.5 38.17
T_g	46.7		38.2	48.5	58.5 68
T_h	57.5		40.9	57.6	1.6 10.9
Sum	57 8.1		43.6	4 7.1	4.7 14.9
Mean	19.0		46.3	16.4	8.0 18.9
Red. to T_m	10.4		51.9	35.2	14.3 26.9
Sum = s	51.4		54.5	44.4	17.4 31.0
$\frac{1}{6}(T_m - T_s)$	57 2.1		57.2	54.0	20.5 35.0
T	60 2.7 49 54.74		449.8 59 40.89	63 5.7 3 7.79	17.4 11.96 16 1.58 8 10.87
RA					
RA — T					
— n tang δ					
ΔT ± m					
$T_m - T_\delta$					
A	0 5.1		1 24.0	3 5.8	0 −1.3 1 6.2
C	27.7		0 53.8	23.3	−23.0 α 30.2
Sum			17.8		96.4
Mean i			1 8.90		0 48.20
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	30	0 0	0	0	20
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.144R

Date Feb. 4 1872 Observer C. A. M. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder A. M. Ex. Therm. = log β =

Star.	B2 + J Persei	B2 + ε Persei	B2 + ζ Persei	B2 + α Tauri	B2 + β Aurigae
	3 34	3 49	4 00	4 29	5 50
T_δ	3 33 21.0	3 33 14.1	3 48 50.6	3 48 41.8	3 58 54.7	3 58 47.7	4 28 12.64	28 10.05	5 49 52.6	5 50 13.7
T_m	24.1	13.0	53.1	42.9	57.8	49.6	14.8	11.0	56.6	15.1
T_e	27.1	15.0	56.0	44.0	0.7	50.9	17.0	10.57	59.4	16.7
T_f	33.3	15.63	1.2	42.90	6.7	49.40	21.2		62.3	15.5 / 15.7
T_g	36.2		3.8		8.9		23.3		65.1	
T_h	39.3		6.6		12.7		25.5		296.0 / 59.20	
Sum	42.4		9.1		16.0		27.7			
Mean	45.5		11.8		19.0		29.9			
Red. to T_m	57.4		17.2		25.0		34.0			
Sum = s	54.6		19.9		28.0		36.2			
$\frac{1}{6}(T_m - T_s)$	57.6		22.6		31.0		38.4			
T	43 25 / 39.32		21.7 / 6.674		14.1 / 12.86		28 0.6 / 2551			
RA										
RA — T										
— n tang δ										
ΔT + m										
$T_m - T_\delta$	0 3 43	0 46.0	2 00	3 8 49	2 35.0
A	0.9	15.2	1 25.3	9.2	7.1
C					
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	0	41.5	0	5	2.5
App. z					
log a′					
A′ log β					
λ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Feb. 7/1872 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.A.R. Ex. Therm. = log β =

Star.	+ Feb. 6 Polaris	+ Feb. 7 Polaris	+ Feb. 7 β Andromedæ B2	+ β Trianguli B2	+ ζ Persei B2
	1 13	1 13	1 52	2 2	2 5
T_δ	1 2 22.3	1 2 25.3	1 55 35.0	1 55 27.8 2 1	2 1 83.3 4 35.2 2 4 21.7
T_m	3 47.9	3 52.8	27.5 27.8	28.7	34.3 38.3 23.3
T_e	6 14.1	5 17.8	250 40.5	29.7	7.6 3380 41.5 25.0
T_f	8 8.9	8 9.6	518 46.0	26.2 28.73	48.0 10.0
T_g	9 35.1 82	9 3.4.4	248 48.7	38.7 42.2	57.3 2330
T_h	11 2.8	11 3.0	28.6 57.4	44.7	54.6
Sum	12 26.1	12 29.5	265 54.3	47.1	57.7
Mean	14 51.0	13 50.6	21.1 57.0	49.7	1.0
Red. to T_m	1239	16 46.6	560 2.5	22314 4468	7.5
Sum = s	1200	18 11.0	24.4 57.3		10.8
$\frac{1}{5}(T_m - T_s)$	3.9	19 36.6	25.6 8.1		14.0
T	11 0.41	11 1.43	1.56 56.6.6 57.51		599.9 54.54
RA		11 2310			
RA — T		21.67			
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A			1 9.4	0 58.0	1 1.2
C			0 42.2	25.0	0 29.4
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer			40	00	85
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.144R

Date Feb. 7 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = log γ

Ex. Therm. = log β =

Star.	× g Trianguli B2	δ Persei B2	× ζ Tauri B2	ε Persei B2	× η Aurigæ B2
T_δ	2 9 16.6	2 9 28.4	2 26 50.3	2 26 29.5	2 55 26.6
T_m	19.0	28.6	58.5		
T_e	21.4	28.35	7.8		
T_f	26.6		24.9	12.4	
T_g	29.1		33.4	14.5	
T_h	31.3		42.1	16.6	
Sum	34.0		57.2	19.0	
Mean	36.3		59.6	21.1	
Red. to T_m	41.3	28	17.1	58.6	
Sum = s	43.7		25.4		
$\frac{1}{5}(T_m - T_s)$	46.1		34.2		
T	345.4		464.5		
	31.40	27	42.23		
RA					
RA — T					
— n tang δ					
ΔT + m					

$T_m - T_\delta$												
A	3	19.2		0	50.8		4	19.2		4	25.6		4	11.9	
C	2	53.0			90.5			43.2		3	43.8		3	42.1	
Sum					141.3										
Mean				0	35.65										
Red. for runs															
Red. to hor. wire															
Red. to meridian															
Division error															
Sum															
Pointer	5			40			35			35			0		
App. z															
log a′															
A′ log β															
λ log γ															
log tang z															
log r															
r															
z															
φ — z = δ (O)															
δ (C)															
δ (C — O)															

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1872phae.proj.1441R

Date Feb. 7 1872 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.A.R. Ex. Therm. = log β =

Star.	+ a Aurigae B2	+ β Orionis B2	+ β Tauri B2	+ Gr. 966 B2	+ θ Aurigae B2
	5 7	5 9	5 18	5 23	5 5 36
T_δ	8 6 46.25	6 58.8 5 8 1.0	5 7 56.6	5 17 48.0	5 17 28.3 21 39.4 21 24.6 35 29.6 ~~30~~ 13.5
T_m	49.1	59.4 3.1	59.7	50.4	39.5 47.8 28.8 32.8 30.4 15.6
T_e	52.0	59.0 5.2	6.4.4	52.7	40.6 53.5 32.0 35.9 33.2 16.7
T_f	58.0	9.4	17.7	57.4	39.4 22 11.4 33.2 42.4 36.4 15.10
T_g	0.8	11.4	59.6	19.4	45.5 42.8
T_h	3.9	13.5	2.1	27.1	48.7 48.9
Sum	6.8	15.6	4.5	85.0	47.9 49.4
Mean	9.7	17.7	6.8	43.0	56.0 52.3
Red. to T_m	15.7	21.8	11.4	57.0	4.4 55.6
Sum = s	18.8	23.9	13.8	23 2.0	4.1.6 2.0
$\frac{1}{b}(T_m - T_s)$	21.6	26.0	16.2	22.6	7.8 5.1
T	3.87	14.5.6 13.51	22.9 18 2.08	302.2 22 27.47	8.2 54.07 49.65
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	1 8.26	3 52.7	4 3.4	2 21.2	3 11.2
C	21.0	31.0	3 38.2	45.7	41.1
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	30	40	50	25	35
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Feb. 8 1872 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

	Star.	Bz + ω Aurigæ	Bz + α Aurigæ	Bz + β Orionis	Bz + Gr. 966	Bz + σ Aurigæ
		5 5	5 7	5 9	5 23	5 36
	T_δ	5 4 14.0 5 4 6.8	5 6 45.7 6 40.5	5 8	5 8 8.8 5 21 39.05 21 30.8	35 29.6 36 2.6
	T_m	16.6 5.0	48.4 42.0		9.7 47.5 31.7	32.8 5.0
	T_e	19.2 9.0 23 8	51.6 43.1 5.6		10.1 28.6 53.0 32.7 5.2	35.9 6.1 13.7
	T_f	24.4 7.93	57.6 41.87	8.9	9.53 22 11.0 31.73	42.4 45.7
	T_g	27.0	0.7	11.0	19.0	45.5
	T_h	29.7	3.5	13.2	24.7	48.7
	Sum	32.5	6.5	15.2	34.6	57.9
	Mean	35.0	9.4	17.4 6 5.7	42.4	55.0
	Red. to T_m	40.2	15.3	13.14	58.3	1.4
	Sum = s	42.9	18.4		23 6.3	4.6
	$\frac{1}{5}(T_m - T_s)$	45.4	21.3		14.3	7.8
	T	32.6 4 29.72	3.54		29 3.5 22 26.68	53 5.6 48.69
	RA					
	RA — T					
	— n tang δ					
	ΔT + m					
	$T_m - T_\delta$					
	A	41 8.9	2 8.0	3 41.7	2 14.1	2 8.9
	C	8 28.8	37.0	20.1	44.0	5.8.9
	Sum					
	Mean					
	Red. for runs					
	Red. to hor. wire					
	Red. to meridian					
	Division error					
	Sum					
	Pointer	0	30	40	25	85
	App. z					
	log a′					
	A′ log β					
	λ′ log γ					
	log tang z					
	log r					
	r					
	z					
	φ — z = δ (O)					
	δ (C)					
	δ (C — O)					

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Date Feb. 8 1872 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	o? B2 α Draco	+ B2 ε Aurigæ	+ B2 θ Aurigæ	+ B2 22 Camel
	?17 38	5 43	5 51	6 5
T_δ	5 36 5665 30 4218	5 42	5 42 3685 5 50 33.9	5 50 25.0 6 4 6 4 33.3
T_m	37 2.3 46.0		36.5	26.0
T_e	8.0 30.7		39.0	27.2
T_f	17.4 139.3 46.50	21.7	44.2	26.7 18.2 22.7
T_g	25.0	24.3	46.7	28.6
T_h	30.7	26.8	49.3	34.3
Sum	36.2	29.5	51.8	40.3
Mean	42.8	32.2	54.5	46.2
Red. to T_m	53.5	134.5 269.0	59.7	172.2 344.4
Sum = s	58.8		2.3	
$\frac{1}{b}(T_m - T_\delta)$	38 5.0		4.9	
T	37 39 8.3 36.21		5 42 5 49.35	
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	4 58.0	1 56.8	2 35.0	2 31.2
C	14.7	2.1	2.1	1 55.4
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	10	15	25	0
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.144R

Date Feb. 8 1872 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

	Bz + μ Mus Min	Bz 65 Aurigæ	× Bz 67 Cephei
T_δ	6 10.— 10 11.8	6 33 18.6 6 33 6.6	35 26.4 6 36 5.91
T_m	10 22.5	21.5 8.0	8.5 40 59.3
T_e	11 1.6	24.4 10.2 24.8	31.6
T_f	12 10.5	30.3 8.27	17.0
T_g	12 49.1	33.1	54.5
T_h	13 2.12	35.9	41.8
Sum	13 54.9	38.8	26.2
Mean	14 29.8	41.8	9.1
Red. to T_m	15 40.0	47.5	34.9
Sum = s		50.4	43.6
$\frac{1}{5}(T_m - T_s)$		53.4	~~42~~
T		39.5 35.9	35 41.5?
RA			
RA — T			
— n tang δ			
ΔT + m			
$T_m - T_\delta$			
A	1 0.7	0 28.6	0 32.6 0 18.8
C	23.0	— 2.7	58.4 19.1
Sum			
Mean			
Red. for runs			
Red. to hor. wire			
Red. to meridian			
Division error			
Sum			
Pointer	0	45	10
App. z			
log a'			
A' log β			
λ log γ			
log tang z			
log r			
r			
z			
ϕ — z = δ (O)			
δ (C)			
δ (C — O)			

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1872phae.proj.1441R

Date Feb. 12 1872 Observer WAR Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder WAR Ex. Therm. = log β =

Star.	+ Polaris 21-40 B2	+ φ Persei B2	+ ε Tauri B2	+ α Tauri B2	+ 4 Camel B2
	1 13	2 57	4 21	4 29	4 38
T_δ	1 2 13.0	2 56 30.2 56 18.7	4 20 44.4 20 39.3	4 28 10.3 4 27 57.8	4 36 46.5 4 36 37.5
T_m	3 4.9	33.3 20.4	46.2 40.4	12.5 5.9.0	6.0.4 38.8
T_e	5 6.4	36.0 21.8 60.9	48.4 41.3 121.0	14.6 5.9.8 26.6	5.4.1 40.2 116.5
T_f	7 5.9.5	41.2 20.30	6.7.7 40.33	18.9 58.7	1.5 38.83
T_g	9 22.4	43.8	54.9	21.0	5.2
T_h	10 49.4	46.4	57.0	23.1	8.4
Sum	12 16.2	49.0	59.1	25.3	12.6
Mean	18 4.24	51.6	1.3	27.4	16.3
Red. to T_m	16 3.5.0	57.0	5.7	31.6	23.4
Sum = s	18 1.4	5.9.5	8.0	33.8	27.6
$\frac{1}{b}(T_m - T_s)$	19 29.5	2.1	10.2	36.0	31.3
T	10 50.72	51 0.5 46.41	62 7.5 57.03	25 4.5 23.14	9 8.4 8.9.5
RA	11 18.78				
RA — T	28.06				
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A		3 26.1	4 5.7.5	3 45.0	2 32.6 2 17.4
C		−6.7	34.4	23.6	6.3 1 50.8
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer		3	2.5	5	6.0
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Feb. 12 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

	× 9 B2 α Camel	× B2 22 Camel	× B2 2 Gemini	× B2 S Mus Min	B2 ν Gemini
	4 42	6 5	6 7	18 13	XX?
T_δ	4 40 37.5	4 40 19.0	6 3 58.1	6 0 39.4	6 6 44.6
T_m	42.8	22.4	4 41.0	40.7	47.0
T_e	48.6	23.8	9.8	43.8	49.0
T_f	58.1	65.2 21.3	21.6	3.9 41.30	53.5
T_g	3.2		27.5		55.7
T_h	8.3		33.3		57.9
Sum	13.3		39.0		02
Mean	18.5		45.0		2.4
Red. to T_m	28.6		56.9		6.8
Sum = s	334		2.6		9.1
$\frac{1}{5}(T_m - T_s)$	38.6		6.5		11.2
T	90.3 8.21		6.3 4 33.0		63.74 55.95
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	2 57	2 15.1	1 13.2	0 53.1	0 32.0
C	35.3	1 45.6	48.8	2.2.2	7.2
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	15	0	50	0	50
App. z					
log a′					
A′ log β					
λ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Feb. 12 1872 Observer N.A.R.

n Recorder N.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T = _____ log γ
log β =

Star.	× γ Geminor B7 6 30				× 55 Aurigae B2 × ×				× 67 Orph. B2 6 41			
T_δ	6 29	55.3	29	45.5	6 33	17.6	32	12.7	—		41 42	32.8 (?) 84 (183)
T_m		57.3		46.6		20.5		14.1	—			
T_e		59.4		48.0 20.1		23.5		15.8 12.6	—			
T_f		3.8		46.70		29.3		1420	—			
T_g		5.9				32.0			—			
T_h		8.1				35.0	33	48.1	39	402		
Sum		10.3				37.8			40	24.0		
Mean		12.4				40.8			41	45		
Red. to T_m		16.7				46.6			42	52.4		
Sum = s		18.9				49.3			43	158		
$\frac{1}{6}(T_m - T_s)$		21.0				52.2			43	381		
T		8.91 8.10				3847 3497						
RA												
RA — T												
— n tang δ												
ΔT + m												
$T_m - T_\delta$												
A	53	16.3			0	18.8	0	−6.7	0	5.3		
C	2	56.1				52.9		−22.6		4 33.3		
Sum												
Mean												
Red. for runs												
Red. to hor. wire												
Red. to meridian												
Division error												
Sum												
Pointer	50				45		45		10			
App. z												
log a′												
A′ log β												
λ′ log γ												
log tang z												
log r												
r												
z												
ϕ — z = δ (O)												
δ (C)												
δ (C — O)												

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1872phae.proj.144R

Date Feb. 14 1872 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = log γ

Ex. Therm. = log β =

Star.	× ν Ursæ Min. B2	× q Persei B2	× a Persei B2	× Gr. 716 B2	× 4 Camel B2
	14 51	2 57	3 15	3 31	4 38
T_δ	2 50 41.02 49 48.72	56 30.556	16.03 14 39.93 14 26.0	3 30 24.1 30 34.8	36 46.5 4 36 33.1
T_m	18.6 50.4	33.1	17.0 43.2 28.1	28.6 36.9	50.1 35.2
T_e	26.1 52.4	35.7	18.3 46.2 28.8	33.2 38.5	54.0 37.0
T_f	41.7 53.7	41.0	21.3 52.7 21.9	42.0 36.73	20.2 1.3 15.3 3510
T_g	50.2 49 51.30	43.5	17.10 55.8 27.30	46.5	5.1
T_h	57.6	46.3	59.0	50.5 31 32.1	8.7
Sum	57 5.1	4.9	2.1	53.3	34.4 12.5
Mean	12.8	51.5	5.3	0.0	35.8 16.1
Red. to T_m	28.7	56.7	11.6	9.0	12.3 34.10 23.8
Sum = s	36.2	59.3	14.7	13.5	27.6
$\frac{1}{5}(T_m - T_s)$	14.3	1.9	17.8	18.1	31.3
T	625.3 56.85	50.84 46.22	648.3 58.94	560.8 50.98	97.0 8.82
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	0 48.0	3 28.7	4 58.3	1 9.0	2 38.6
C	11.6	2.3	28.7	37.6	8.3
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	0	0	0	0	0
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date ~~Oct~~ Feb. 14 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.A.R. Ex. Therm. = log β =

Star.	× a + 9 Camelop B2	× 22 Camel B2	× η Gemin B2	× S Mus Min B2
	41 42	6 5	6 7	18 13
T_δ	4 4 40 10.00	8 58.1 6 3 39.4	6 6 44.56 33.0	10 38.8
T_m		4 41.0 40.7	46.8 34.3	
T_e		9.8 43.8	47.1 35.7	
T_f	40 58.1	21.6 123.9 41.30	53.4 34.33	6 12 10.7
T_g	3.3	27.5	55.6	45.7 13 35.2
T_h	8.0	33.3	57.9	13 20.8
Sum	13.4	37.0	0.1	55.5
Mean	18.5	45.0	2.3	14 29.8
Red. to T_m	41.3 f26	46.9	6.8	102.5 13 2050
Sum = s		5 2.6	9.0	
$\frac{1}{5}(T_m - T_s)$		8.5	11.2	
T		3563 4 3330	6367 57.88	
RA				
RA — T				
— n tang δ				
ΔT ± m				
$T_m - T_\delta$				
A	2 15.6	2 52.0	1 20.2	1 0.8 1 13.5
C	1 40.6	17.0	51.0	23.6 36.0
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	15	0	50	0
App. z				
log a'				
A' log β				
λ' log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.144R

Date Feb. 14 1872 Observer WAR

n Recorder W.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T = _____ log γ
log β =

Star.	B2 ζ Geminor.	B2 χ Geminor.	B2 55 Aurigæ	B2 51 Ceph.	Polaris
	×× ?	6 30	××	6 41	1 13
T_δ	6 20 57.5 20	51.9 6 29 55.1 29	46.3 6 33 17.5 33	1.0 6 35 24.5 6 42 57.2	1 12 13.2
T_m	59.7	52.8 57.2	47.2 20.4	2.0 36 8.2	10 47.0 46.6 13 35.0
T_e	1.9	54.0 59.5	48.2 23.3	3.6 36 50.0	48.1 16 32.9
T_f	6.3	52.90 3.7	47.40 29.1	6.0 38 15.8	47.9 49.0 17 58.9
T_g	8.5	5.8	31.9	56 58.2	19 26.2
T_h	10.6	8.0	34.9	39 40.0	
Sum	12.8	10.2	37.8	40 22.7	
Mean	15.1	12.3	40.7	41 6.9	
Red. to T_m	19.4	16.6	46.5	42 33.0	
Sum = s	21.5	18.8	49.3	43 13.8	
$\frac{1}{5}(T_m - T_s)$	2.38	2.09	5.27	43 58.0	
T	11 81 10 74	88.1 8.01	38 3.6 34.87	451.1 39 41.01	10 47.72
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	0, ~~270~~ 15.0	3 22.5	0 33.5	0 57	
C	~~28~~ 46.0	2 51.8	1.8	2.00	
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	58	30	45	10	
App. z					
log a′					
A′ log β					
λ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Feb. 16 1872 Observer A. M. Barom. = log B =
Att. Therm. = log T = log γ
n Recorder W. M. Ex. Therm. = log β =

Star.	ψ, Aurigæ	63 Aurigæ	64 Aurigæ	19 Lyncis
	6 15	7 3	7 9	7 13
T_δ	6 14 32.0	7 2 23.7	7 8 40.7	7 11 52.7
T_m	35.2	26.4	43.2	55.6
T_e	38.3	29.0	45.9	59.3
T_f	44.7	34.4	51.4	6.5
T_g	47.7	37.0	54.1	10.4
T_h	50.8	39.7	56.8	14.0
Sum	54.1	42.4	59.5	17.5
Mean	57.3	45.1	2.2	21.1
Red. to T_m	3.6	50.5	7.6	28.5
Sum = s	6.8	53.0	10.5	32.0
$\frac{1}{5}(T_m - T_\delta)$	9.9	55.7	13.3	35.7
T	14 560.14	2 436.9	8 625.0	12 152.7
	14 50.95	2 39.72	8 56.82	12 13.88
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	3 9.3	2 20.3	2 31.1	3 2.1
C	38.4	58.2	7.3	31.0
Sum	107.7	24.5	42.4	93.1
Mean i	2 53.85	2 1225	2 21.20	2 4655
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	0	50	15	60
App. z				
log a'				
A' log β				
λ' log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.144R

Date Feb. 16 1872 Observer A. M. Barom. = log B =

Att. Therm. = log T = log γ

n Recorder A. M. Ex. Therm. = log β =

Star.	+ ζ Geminor	+ ϱ Gem.	+ α Gem.	+ β Gem.	ζ Hydræ	+ κ Cephei
	7 18	7 21	7 27	7 38	++ ?	20 12 ?
T_δ	7 17 21.3	7 17 11.0	7 20 54.57	26 0.0 7 25 50.0	37 3.6 7 36 59.1	824 57.7 8 12
T_m	23.8	12.5	56.0	2.6 51.7	6.0 60.4	59.1 57.4 94
T_e	26.0	14.0 7.6	57.6 18.1	5.0 52.9 4.6	8.4 6.1.7	61.1 13 6.4 90
T_f	30.7 17	12.537 20	36.6 20 56.03	9.9 25 51.53	13.1 37 0.40 0	18.2 16.8 36.3
T_g	33.0	39.1		12.3	15.4	23.8 14.8 85
T_h	35.3	41.5		14.8	17.7	29.7 — 54.6 98
Sum	37.6	43.8		17.2	20.2	41.2 14 3.4 88
Mean	4.0.0	46.2		19.5	22.4	46.7 12.8 94
Red. to T_m	44.6	20 7.2 47.44		24.4	27.1	52.6 32.0 193
Sum = s	46.9			26.9	29.4	58.3 41.0 94
$\frac{1}{5}(T_m - T_s)$	49.3			29.3	31.9	4.0 50.6 96
T	17 38 8.3 35.32			26 1 61.9 14.72	37 19 5.2 17.75	15.3 13 54.15
RA						21.0
RA — T						26.8
— n tang δ						577.6
ΔT + m						m 0 52.52

$T_m - T_\delta$												
A	0	54.7		1	38		3	54.0	3	50.2	no. ✓	no. ✓
C		27.5			36.8			31.7		22.0		
Sum		82.2			1006			89.7		722		
Mean	0	41.10		0	50.30		3	44.85	3	36.10		
Red. for runs												
Red. to hor. wire												
Red. to meridian												
Division error												
Sum												
Pointer	20			20			20		0			
App. z												
log a′												
A′ log β												
λ′ log γ												
log tang z												
log r												
r												
z												
ϕ — z = δ (O)												
δ (C)												
δ (C — O)												

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Date Feb. 17 1872 Observer A.M. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder A.M. Ex. Therm. = log β =

Star.	× α Aurigæ		× 17 Camel		× 11.966		+ β Tauri	
	5 7		5 18		5 23		5 30	
T_δ	5 6 44.1	5 6 32.2	17 25.6	17 11.8	21 36.8	21 21.8	29 34.6	29 25.5
T_m	47.1	24.2	30.2	13.4	45.3	23.3	36.9	29.6
T_e	50.0	36.1	34.6	15.6	53.0	25.7	39.1	31.0
T_f	55.9	12.5 / 3417	43.8	10.8 / 1360	9.1	10.8 / 2360	43.3	89.1 / 2770
T_g	58.6		48.3		16.8		45.7	
T_h	1.8		52.7		24.6		47.8	
Sum	4.8		57.5		32.6		50.0	
Mean	7.6		2.0		40.4		52.4	
Red. to T_m	13.4		10.8		56.3		56.6	
Sum = s	16.6		15.5		23 4.6		59.0	
$\frac{1}{6}(T_m - T_s)$	19.6		20.2		12.0		61.1	
T	7 17.7 / 1698		58.1.2 / 17 5284		271.5 / 22 2468		526.5 / 29 4786	
RA								
RA — T								
— n tang δ								
ΔT ± m								
$T_m - T_\delta$								
A	2 13.2		1 6.48		2 17.6		0 59.2 / 0.8	
C	45.8		27.0		46.0		30.7	
Sum	1190		83.8		3.6		92.9	
Mean	1 59.50		1 41.90		2 1.80		0 46.45	
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer	30		25		25		20	
App. z								
log a'								
A' log β								
λ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

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1872phae.proj.144R

Date Feb. 17 1872 Observer Hill

n Recorder A. M.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T = _____ log γ
log β =

Star. β Aurigæ | 63 Aurigæ | 64 Aurigæ | 19 Lyncis

T_δ	6 14 31.4	6 14 23.0	2 23.4	7 2 19.2	7 9	7 9 11.2	7 11 51.8	7 11 47.1
T_m	34.6	25.2	26.0	20.5		12.7	55.5	48.5
T_e	37.9	27.4	28.8	24.7		14.0	59.0	50.3
T_f	44.3	14 25.20	34.1	2 20.47	7 8 51.1	9 12.63	6.4	11 48.63
T_g	47.4		36.8		53.7		10.1	
T_h	50.6		39.4		56.6		13.6	
Sum	53.6		42.0		59.3		17.1	
Mean	56.7		44.7		1.9		21.0	
Red. to T_m	3.0		50.1		56.52		28.2	
Sum = s	6.3		52.8				31.8	
$\frac{1}{5}(T_m - T_s)$	9.5		55.4				35.4	
T	14 55 5.5		2 483.5		8 56.52		12 14 49 13.63	
RA	14 55 0		2 39.41					
RA — T								
— n tang δ								
ΔT + m								
$T_m - T_\delta$								
A	3 7.7		2 21.2		1 44.9		3 3.1	
C	36.2		54.0		26.6		30.2	
Sum	103.9		152		715		933	
Mean	2 51.95		2 7.60		1 35.75		2 46.65	
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer	0		50		15		50	
App. z								
log a′								
A′ log β								
λ log γ								
log tang z								
log r								
r								
z								
ϕ — z = δ (O)								
δ (C)								
δ (C — O)								

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Date Feb. 17 1872 Observer A.M. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder A.M. Ex. Therm. = log β =

Feb. 19 Polaris 1 13

Star.	† Gr 1308	† 8 9 Gem.	† α Gem.	† β Gem.	
	7 18	7 21	7 27	7 38	
T_δ	7 16 47.1	7 16 31.5	7 20 26.6	7 20 16.1	25 0.0 25 53.1 37 3.4 36 56.4
T_m	52.9	33.2	29.0	17.5	2.1 54.1 5.9 58.0
T_e	58.7	36.2	31.4	18.9	4.5 55.4 8.3 59.8
T_f	10.1	10.9 16 33.63	36.4	22.3 20 17.50	9.6 25 12.6 5420 12.8 24.2 36 58.07 1 7 54.1
T_g	15.7	38.7	12.0		15.3 9 17.5 23.4
T_h	21.7	41.3	14.4		17.4 10 43.7 10 44.0
Sum	27.0	43.6	16.7		19.7 46.5 12 11.1
Mean	32.6	46.0	19.2		22.2 44.9 46 36.4
Red. to T_m	44.5	51.0	23.9		26.8 10 36.6
Sum = s	50.0	53.1	26.6		29.1 10
$\frac{1}{5}(T_m - T_s)$	55.9	55.7	29.0		31.6
T	17 21.47	20 41.16	26 14.36	37 17.50	10 44.77
RA					
RA — T					
— n tang δ					
ΔT ± m					
$T_m - T_\delta$					
A	1 8.6	1 48.8	3 5.45	3 58.9	
C	33.9	17.3	27.0	23.8	
Sum	1025	63.1	81.5	777	
Mean	0 51.25	1 31.55	3 40.75	3 38.85	
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	40	20	10	0	
App. z					
log a'					
A' log β					
λ' log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.144MR

Date Feb. 24 Observer MAR Barom. = log B =

n Recorder MAR. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	× B2 1 Camel	× a? B2 15 Draco	× B2 4 Camel	× B2 a Camel	× B2 i Aurigae
	4 22	16 28?	4 38	4 42	4 49
T_δ	24 20	51.0 27	2.7 36	44.0 36	30.8 40 35.0 40	14.0 48 10.9 48 1.4
T_m	17.8 18.6 20.2 22.1	53.5 —	3.8	47.7	33.6 40.0	16.3 13.4 2.5
T_e	24.6 25.6	56.6 27 51.2 10.1	5.1 11.6	51.5	36.0 45.1	18.6 15.8 3.6
T_f	31.5 32.5	58.37 56.7	28.7	59.0	10.4 33.4 55.3	18.9 25 16.30 20.7 25.0
T_g	35.1 35.9	2.4		2.6	0.3	23.1
T_h	38.5 39.3 21	1.2 8.4 28	20.6	6.4	5.5	25.6
Sum	42.0 42.8	3.0 14.1		10.1	10.5	28.1
Mean	45.5 46.4	4.1 25.6		13.9	15.5	30.6
Red. to T_m	52.4 53.3	5.3 2.7 31.3		21.4	25.5	35.5
Sum = s	55.8 56.7	—		25.0	30.8	37.8
$\frac{1}{5}(T_m - T_s)$	59.4 60.3			28.8	35.8	40.3
T	42.49 43.35 38.63 39.41		37	71.4 64.0	59.6 5.42	28.18 25.62
RA						
RA — T						
— n tang δ						
ΔT + m						
$T_m - T_\delta$						
A	0 53.3	3 39.6	2 20.5	1 45.1	0 56.1
C	22.0	54.6	48.8	17.6	33.1
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	45	25	50	15	25
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Feb. 24/72 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = log γ

Ex. Therm. = log β =

Star.	† ε Aurigae B2	† β Aurigae B2	† δ Ursae Min. B2	† 51 Cephei.	† Feb. 26 Polaris
	4 53	4 52	18 13	6 41	1 13
T_δ	4 52 16.1	52 6.0	53 16.3	6 10 38.5	
T_m	18.5	7.3 53	4.4		
T_e	21.5	8.7	7.0	13 35.2	
T_f	27.4	22.0 7.33	12.5		
T_g	30.2		15.2		
T_h	33.1		18.0		
Sum	35.9		20.7		
Mean	38.8		23.4		
Red. to T_m	44.4		28.9		
Sum = s	47.3		31.6		10 37.61 $18^{6.5}$ 22.4
$\frac{1}{5}(T_m - T_s)$	50.3		34.3		39.1 $18^{7.5}$ 50.1
T	3 64.1 33.10				10 38.35
RA					
RA — T					
— n tang δ					
ΔT +⁻m					
$T_m - T_\delta$					
A	0 49.4	0 29.7	1 1.6	4 48.3	
C	25.2	- 03	22.8	17.6	
Sum				65.9	
Mean				4 32.95	
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	45	30	0	1	
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.144R

Date Feb. 24/72 Observer M.K. Barom. = log B =

n Recorder M.K. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	× B2 63 Aurigae	× B2 a Geminor	× B2 β Gem.	× B2 μ.1374	B2 Gem
	7 3	7 27	7 38	7 45	×× ?
T_δ	7 2 25 50.2	25 58.8 25 47.8	37 1.8 36 54.2	43 52.0 44 12.9	7 46 51.2
T_m	51.0	1.5 48.6	4.2 55.1	9.7 17.2	52 34.5
T_e	52.2 3.4	3.5 49.6 2.5 4	6.5 55.8 15.1	44 7.1 20.5 50.6	49 42.5
T_f	32.4 51.13	8.7 48.47	11.2 55.03	22.4 16.8	47 58.0
T_g	35.0	11.2	13.5	30.2	49 48.8
T_h	37.6	13.6	15.9	38.0	67 36.9
Sum	40.3	16.0	18.2	45.4	53 26.6
Mean	42.9	18.5	20.6	52.8	55 15.6
Red. to T_m	188.2 37.64	23.4	25.2	46 7.7	185.9 57 37.18
Sum = s		25.7	27.6	15.8	
$\frac{1}{5}(T_m - T_s)$		28.3	30.0	23.3	
T		149.5 10.59	174.7 15.58	414.4 44 37.67	
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	1 25.6	3 30.2	3 30.9	3 40.0	4 35.2 47.9
C	0.0	7.3	6.0	11.1	7.0 15.0
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	50	10	0	6	5
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.144R

Date 1872 Feb 27 Observer W.A.R.

n Recorder W.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	+ a Aurigæ	+ β Orionis	+ β Tauri	+ M. 966
	B2	B2	B2	B2
	5 7	5 9	5 18	5 23
T_δ	5 6	6 45.6	5 8 23.4	17 44.7 17 36.1 21 35.3 21 18.2
T_m		46.8	24.5	47.0 37.7 43.3 20.6
T_e		48.4	25.7	49.3 39.6 50.9 26.1
		20.8	13.6	23.4 6.4
T_f	54.5	4693 6.0	24.53	51.0 37.80 22 6.6 2463
T_g	57.5	8.0		56.3 14.6
T_h	0.4	10.1		58.7 22.6
Sum	3.4	12.2		1.0 3.07
Mean	6.3	14.5		3.4 38.5
	2.1	50.8		
Red. to T_m	7 042	1016		8.0 54.5
Sum = s				10.4 23 2.2
$\frac{1}{5}(T_m - T_s)$				12.7 10.4
				14.5-5 24 8.6
T	6.42			58.68 22 22.60
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	1 41.1	3 6.5	3 45.3	2 2.7
C	10.3	44.7	14.9	25.6
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	30	40	50	25
App. z				
log a'				
A' log β				
λ' log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.144R

Date Feb. 27 1872 Observer M.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder M.A.R. Ex. Therm. = log β =

Star.	× Aurigae	× δ Persei	× 67 Orionis	× 15 Lyncis	× λ Tauri
	B2	B2	B2	B2	B2
	5 43	18 13	6 41	6 46	19 49
T_δ	5 42 7.8 42 1.5	6 12 14 47.0	35.6 — 36	52.0 45 34.7	6 45 35.47 38 X
T_m	10.6 3.0		— 41	10.2 2.2 38.6	36.0
T_e	13.1 4.8		36 40.3 39	1.10 42.5	36.6 18.8
T_f	18.6 9.3 9.10	12 15.8	38 8.0	50.5	36.00
T_g	21.1	50.6		54.4	
T_h	23.7	13 25.8		58.4	
Sum	26.5	14 0.2		2.6	
Mean	29.1	14 34.8 12.2	40 59.4	6.2	
Red. to T_m	34.4	13 25.44	42 25.5	14.2	56.3
Sum = s	37.0		43 17.3	17.9	47.5
$\frac{1}{5}(T_m - T_s)$	39.7		43 50.0	22.0	34.6
T	26.16 23.78			45 64 20.0 58.36	
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	2 10.4	0 9.8	0 12.0 4 56.3	3 35.7	0.0 ✓
C	40.7	20.9	-27.0 17.4	5.7	
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	15	0	10 15	45	4
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Mar 11 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	† (Bl. 28) Polaris	† Mitchell Polaris	† α Aurigæ B2	† β Aurigæ Orionis? B2	† Gr. 966 B2	β Orionis B7
	1 13		5 7	5 9	5 23	5 12
T_δ			5 6 41.57	7.8 7 56.67 50.3	21 33.4 21 53.5	5 10 57.0
T_m			44.4	58.7 51.3	41.2 56.0	59.0
T_e			47.4	0.8 52.1	49.3 58.0	1.1
T_f	1 7 43.3		53.4	5.0 57 3.7 23	22 5.4 59.6 24.1	5.2
T_g	5 8.3		56.3	7.1	13.2 56.78	7.4
T_h	10 3 59		59.4	9.1	21.2	9.4
Sum	12 59.6		2.4	11.2	28.7	11.6
Mean	13 2.77 174.8		57.2	13.2	36.8	13.6
Red. to T_m	10 34.96	16 15.8 10 30.5	11.1	17.4	52.9	17.7
Sum = s		17 42.7 31.7	14.1	19.6	23 1.0	19.7
$\frac{1}{5}(T_m - T_s)$		19 7.7 31.0	17.0	21.7	8.6	21.8
T	10 34.96	10 31.07	652.2 59.29	10 0.14 9.13	23.17 22 21.06	10 3.5 9.41
RA						
RA — T						
— n tang δ						
ΔT + m						
$T_m - T_\delta$						
A			1 23.8	3 45.6	1 45.7	
C			33.0	21.8	15.0	
Sum						
Mean						
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer			30	40	25	
App. z						
log a′						
A′ log β						
λ′ log γ						
log tang z						
log r						
r						
z						
ϕ — z = δ (O)						
δ (C)						
δ (C — O)						

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1872phae.proj.144R

Date Mar 11 1872 Observer

n Recorder

Barom. = Att. Therm. = Ex. Therm. =

log B = log T = log β =

log γ

	Star.	× Bz 1 Mes. Mic	× Bz 57 Eqph.	× Bz 64 Aurigæ	× Bz 1 Gem.	× Bz i Gem.	× Bz a Gem.
		18 13	6 41	7 9	7 13	7 18	
57.0	T_δ	6 16 29.5	41 10.0	7 8 48.7 7 8 49.7	12 35.8	17 18.7 17 31.1	
59.0	T_m			51.5	36.6	21.0	25 35
1.1	T_e			54.2	37.5 19.9	23.4	25 57.5
5.2	T_f			57.0	38.3	28.1	0.0
7.4	T_g			59.7		30.4	2.4
9.4	T_h					32.7	7.3
11.6	Sum					35.0	9.8
13.6	Mean		40 53.4			37.4	12.3
17.7	Red. to T_m		42 19.7		12 23.8	42.1	14.6
19.7	Sum = s	16 20.3	43 1.9		26.1	44.4	17.0
21.8	$\frac{1}{5}(T_m - T_s)$	16 54.5	43 44.8		28.2	46.7	21.9
03.5	T					35 9.9	
9.41						32.72	24.3
	RA						26.7
	RA — T						1.3 3.18
	— n tang δ						12.18
	ΔT + m						
	$T_m - T_\delta$	1					
	A	1 1.7	4 46.9	1 53.0	4 38.5	8 8.9	8 31.2
	C	28.9	12.2	27.0	12.6	41.9	59
	Sum						
	Mean						
	Red. for runs						
	Red. to hor. wire						
	Red. to meridian						
	Division error						
	Sum						
	Pointer	0	5	15	8	15	10
	App. z						
	log a′						
	A′ log β						
	λ log γ						
	log tang z						
	log r						
	r						
	z						
	φ — z = δ (O)						
	δ (C)						
	δ (C — O)						

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1872phae.proj.144HR

Date Mar 14 1872 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	+ 22 Camel B2			× n Gem. B2		× S Mic. Min B2			γ Gem. B2		
	6 5			6 7		18 13			+ ×		
T_δ	6 4	4	44.8	6 42.3	6	34.6		14 45.4	33 15.2	33	7.0
T_m			47.1	44.5		35.8			18.0		8.0
T_e			50.3	46.7		37.0			20.9		9.3
T_f			47.40	57.2		35.88	12	19.9	26.8		
T_g	24.0			53.4				54.6	29.7		
T_h	30.1			55.7			13	29.9	32.5		
Sum	36.1			58.8				4.7	35.4		
Mean	41.8			0.1				39.0	38.4		
Red. to T_m				4.6					44.1		
Sum = s				6.9					47.0		
$\frac{1}{5}(T_m - T_s)$				9.1					49.8		
T				613.3							
RA				55.45							
RA — T											
— n tang δ											
ΔT + m											
$T_m - T_\delta$											
A	1	6.5.7		0 54.4			0	48.8	2	53.8	
C		28.6		30.4				19.1		25.0	
Sum											
Mean											
Red. for runs											
Red. to hor. wire											
Red. to meridian											
Division error											
Sum											
Pointer	0			30			0		30		
App. z											
log a'											
A' log β											
λ' log γ											
log tang z											
log r											
r											
z											
φ — z = δ (O)											
δ (C)											
δ (C — O)											

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1872phae.proj.144R

Date Mar 14 1872 Observer N.A.R.

n Recorder W.A.R.

Barom. = Att. Therm. = Ex. Therm. =

log B = log T = log β = log γ

Star.	× 53 B2 ? 68 Aurigæ		× B2 57 Persei.		B2 α Cam. Maj. 58 Aurigæ			B2 + β Persei.		
	6 30			6 41						
T_δ	6 29 53.0	29 47.1	35	12.6	34 50.8	39 3.3	39 3.3	41 19.8.7	37 1.0	36 50.7
T_m	53.1	48.2		53.2		5.5	41 12.8	21.3	3.3	51.6
T_e	57.2	49.4		35.5		7.7	15.5	22.6	5.5	52.9
T_f	1.5		38	2.9		11.9	18.3		10.4	
T_g	3.7					14.1	23.9		12.6	
T_h	5.9					16.2	26.6		15.0	
Sum	8.0					18.4	29.5		17.4	
Mean	10.1					20.7	32.3		19.7	
Red. to T_m	14.6					24.9	35.1		24.4	
Sum = s	16.6					27.0	40.6		26.6	
$\frac{1}{5}(T_m - T_s)$	18.7					29.2	43.3		29.0	
T							46.0			
RA										
RA — T										
— n tang δ										
ΔT + m										
$T_m - T_\delta$										
A	0 0.4		0	8.3			2 39.9		8 34.0	
C	4 37.2			88.9			17.1		8.4	
Sum										
Mean										
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer	48		10				28		0	
App. z										
log a'										
A' log β										
λ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

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1872phae.proj.144MR

Date Mar 14 1872 Observer WAR

n Recorder WAR

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T = _____ log γ
log β =

Star.	× Gr. 1374	× ε Draco	× ν Ursæ Min	× κ Cephei
		Bγ	Bγ	Bγ
	7 45	16.7 19 49	19 49	20 13
T_δ	7 43 50.8	43 36.40 39.5 47 44.6	48 2.0 50	23.8 11 56.7 11 40.0
T_m	58.2	74 36.20 50.6		6.1
T_e	44 5.8	76 14.9 36.20 56.5		15.6
T_f	20.7	79 35.90 8.6		34.5
T_g	28.6	76 36.20 14.7		43.7
T_h	36.2	75 36.20 20.5	51 46.3	52.7
Sum	43.7	36.10 26.5		2.3
Mean	14.0	1.20 36.17 32.4	55 26.4	11.8
Red. to T_m	19.80	44.7		31.0
Sum = s		50.6	0 34.3	39.9
$\frac{1}{5}(T_m - T_s)$		56.3		49.9
T	7 44 36.7			
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	3 37.8	2 25.6	4 42.9	4 44
C	8.7	51.8	8.7	30.7
Sum	46.5			
Mean	3 23.25			
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	5	20	15	40
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date Mar 18 1872 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.A.R. Ex. Therm. = log β =

	Star.	✝ Sheliak B2	55 Aurigae B2	✝ 67 Ophi. B2	α Cam Maj B2	58 Aurigae
		2 18 13	××	6 41	××	×× ?
T_δ		6 16 10.2	33 13.9 33	7.0 35 7.9 34	55.8 39 3.3 38	55.5 41 11.4 41 27.3
T_m			16.6	8.7 30.1	5.5 56.7	14.2 28
T_e			19.7	9.9 32.3	7.7 57.6	17.0 28
T_f			25.3	37 58.0	11.9	22.6 56
T_g			28.3		14.0	25.3 27
T_h			31.1		16.2	28.1 28
Sum			34.0		18.4	30.8 27
Mean			37.0		20.7	33.6 28
Red. to T_m		15 51.0	42.7		24.9	37.1 55
Sum = s		16 232	45.6		27.0	42.0 29
$\frac{1}{5}(T_m - T_s)$		16 58.0	48.5		29.2	44.7 27
T						80 8.18 41 28.07
RA						
RA — T						
— n tang δ						
ΔT + m						
$T_m - T_\delta$						
A		1 37	0 4.2	0 128		2 36.0
C		28.9	34.9	4 39.1		8.0
Sum						45.0
Mean						27 22.50
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer		0	43	10		25
App. z						
log a′						
A′ log β						
λ log γ						
log tang z						
log r						
r						
z						
ϕ — z = δ (O)						
δ (C)						
δ (C — O)						

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1872phae.proj.1441R

Date Mar 18 1872 Observer

n Recorder

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	× Bd Blem.	× Bd Gr. 1374	× Bd ε Draco	× Bd ν Dra Min β
	7 38	7 45	19 49	19 49
T_δ	7 37 0.6 36 49.8	44 40.0	47 44.8 47 59.3	50 59.6
T_m	3.0 51.2		50.4	
T_e	5.2 52.5		56.8	
T_f	10.0	44 20.3	8.9	—
T_g	12.3	27.7	14.6	50 6.0
T_h	14.8	35.6	20.6	51 5.0
Sum	17.0	42.8	26.9	42.4
Mean	17.3	30.7	32.8	32.5
Red. to T_m	24.0		45.0	
Sum = s	26.3		51.0	
$\frac{1}{5}(T_m - T_s)$	28.7		56.8	
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	3 31.8	3 33.4	2 3.0	4 46.8
C	1.4	30.0	24.9	8.2
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	0	5	20	16
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date Mar 18 Observer N.P.R Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder Ex. Therm. = log β =

Star.	× β Cancri B2 δ 10	× o Hya Maj B2 δ 20	× π Cancri B2 δ 26	S Hydrae B2 ××
T_δ	8 9 7.9	8 9 0.3	18 57.4	18 57.0 24 51.3 24 44.5 30 26.6 30 15.9
T_m	10.0	1.3	1.5	53.4 45.5 28.6 19.8
T_e	12.2	2.4	5.9	55.6 46.5 30.7 20.7
T_f	16.3		14.2	0.1 34.8
T_g	18.3		18.6	2.1 36.9
T_h	20.4		22.8	4.3 39.0
Sum	22.5		27.0	6.6 41.0
Mean	24.6		31.4	8.8 43.1
Red. to T_m	28.8		40.0	13.2 47.2
Sum = s	30.9		44.2	15.3 49.3
$\frac{1}{5}(T_m - T_s)$	33.0		48.6	17.6 51.4
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	3 32.1	0 20.4	1 0.7	4 12.4
C	7.0	−13.0	32.7	47.8
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	45	15	30	10
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date Mar 21 1872 Observer W.A.R. Barom. = log B =
Att. Therm. = log T = _____ log γ
n Recorder W.A.R. Ex. Therm. = log β =

Star.	× 63 Aurigae (B2)			× 64 Aurigae (B2)			× S Gem. (B2)			66 Aurigae (B2)		
	7 3			7 9			7 13			7 7		
T_δ	7 2 20.2	7 2 13.2		7 8 37.1	7 8 29.7		12 0.9	11 50.9		14 45.4	14 38.2	
T_m	22.8	14.3		39.6	31.1		3.1	51.8		48.2	39.4	
T_e	25.6	15.8		42.4	32.1		5-3	53.0		50.9	40.7	
T_f	30.9			48.0			9.9	57.0		56.4		
T_g	33.6			50.6			12.0			59.2		
T_h	36.2			53.3			14.3			1.8		
Sum	38.9			56.2			16.4			4.5		
Mean	41.6			58.8			18.6			7.2		
Red. to T_m	46.8			4.3			23.0			12.6		
Sum = s	49.6			7.0			25.3			15.3		
$\frac{1}{5}(T_m - T_s)$	52.2			9.7			27.5			18.1		
T												
RA												
RA — T												
— n tang δ												
ΔT ± m												
$T_m - T_\delta$												
A	2 7.0			2 11.0			0 35.8			3 46.0		
C	37.0			46.2			4.9			16.3		
Sum												
Mean i												
Red. for runs												
Red. to hor. wire												
Red. to meridian												
Division error												
Sum												
Pointer	50			15			10			25		
App. z												
log a′												
A′ log β												
λ log γ												
log tang z												
log r												
r												
z												
φ — z = δ (O)												
δ (C)												
δ (C — O)												

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1872phae.proj.1441R

Date Mar 21 | Observer | Barom. = | log B =
Att. Therm. = | log T = _____ log γ
n | Recorder | Ex. Therm. = | log β =

Star.	× Q Gem B2	× a Gem. B2	35 Lyncis B2	× i Ursæ Maj B2	× π Ursæ Maj B2
	7 21	7 27	1st	8 51	8 55
T_δ	1 20 23.5	20 21.2	25 56.4 56.8	25 42.5	8 43 24.9
T_m	25.9	22.2	58.8 59.2	2nd 43.9	56.6 41.6
T_e	28.4	23.7	1.3 1.7	25 45.3	59.7 42.8
T_f	33.1	/	6.1 6.5		59
T_g	35.7		8.6 9.0		9.0
T_h	38.0		11.0 11.5		12.2
Sum	40.5		13.5 13.9	43 9.7	15.3
Mean	42.9		15.8 16.2	12.7	18.4
Red. to T_m	47.8		20.8 21.1	18.5	23.6
Sum = s	50.3		22.1 22.4	21.3	27.7
$\frac{1}{5}(T_m - T_s)$	52.7		25.5 25.9	24.2	30.8
T					
RA					
RA — T					
— n tang δ					
ΔT + m					

$T_m - T_\delta$					
A	1 11.8	3 46.3	1 7.9	1 26.8	3 31.0
C	50.4	16.3	35.2	52.0	58.0
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	20	10	10 50	30	40
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Mar 21 | Observer | Barom. = | log B =
| Att. Therm. = | log T = _____ log γ
n | Recorder | Ex. Therm. = | log β =

Star.	× Br 2749 = B2	× B2	×
	S. S. Cirr	Q. Pers. Maj	1 M Draco
T_δ	20 53 8	52 35.0	8 59 58 20.0
T_m			25.3
T_e			30.7
T_f	52 38.2		41.5
T_g	50.4		47.1
T_h	2.1		52.5
Sum	141		57.4
Mean	26.3		3.6
Red. to T_m			14.3
Sum = s			19.6
$\frac{1}{5}(T_m - T_s)$			25.0
T			
RA			
RA — T			
— n tang δ			
ΔT ± m			
$T_m - T_\delta$			
A	3 31.0		4 68.2
C	58.0		26.7
Sum			
Mean			
Red. for runs			
Red. to hor. wire			
Red. to meridian			
Division error			
Sum			
Pointer	40		40
App. z			
log a′			
A′ log β			
λ log γ			
log tang z			
log r			
r			
z			
ϕ — z = δ (O)			
δ (C)			
δ (C — O)			

58 15.6	9 17 00	
16.6	14.2	
20.4	28.8	
	58.3	
	18 13.0	
59 5.0	27.7	
8.4	42.1	
11.3	56.7	
	19 26.3	
	40.7	
	55.5	
	30 3.3	
	18 27.57	
4 37.6		
0.7		

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1872phae.proj.1441R

Date Mar 27 Observer W.K. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.K. Ex. Therm. = log β =

Star.	B2 66 Aurigae	× B2 i Gem.	× B2 a Gem.	× B2 o Ursæ Maj	× B2 a Aurigæ
	7 14	7 18	7 27	8 20	8 25
T_δ	44.5 14 38.2	17 17.0 17 9.2	25 55.4 55.7 25 48.1	8 15 56.2 8 18 52.0	24 50.0 24 43.7
T_m	47.2 39.5	19.3 10.6	57.8 58.1	0.3 54.3	52.1 44.9
T_e	49.8 40.7	21.6 11.6	0.1 0.5 25 46.0	4.4 55.9	54.3 45.8
T_f	55.3	26.3	5.0 5.4	13.0	58.8
T_g	58.1	28.6	7.4 7.8	17.4	0.9
T_h	0.9	31.0	9.9 10.3	21.7	3.2
Sum	3.5	33.3	12.3 12.7	25.9	5.4
Mean	6.3	35.6	14.7 15.1	30.1	7.6
Red. to T_m	11.8	40.4	19.6 20.0	36.5	12.1
Sum = s	14.5	42.7	22.1 22.5	42.9	14.2
$\frac{1}{5}(T_m - T_s)$	17.1	45.0	24.4 24.8	47.2	16.4
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	3 89.5	0 29.9	3 34.9	0 16.2	0 5.7
C	13.6	4.4	10.9	4 46.4	3.2
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	25	20	10	15	30
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Mar 27 1872 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder W.A.R. Ex. Therm. = log β =

Star.	× Bd ζ Cancri	× Bd i Ursæ Maj	× Br 2749 = Bd 20 1679	× Bd o Ursæ Maj	× Bd 1 Draconis
T_δ	8 45 56.5	8 51 45 50.0	49 52.4	49 47.0	51 49.1
T_m	58.9	55.6	48.4	1.5	
T_e	1.2	58.8	50.0	13.2	
T_f	6.1	5.0		37.2	
T_g	8.4	8.1		49.0	
T_h	10.7	11.2		1.0	
Sum	13.3	14.3		12.7	
Mean	15.6	17.5		24.6	
Red. to T_m	20.5	23.6		48.7	
Sum = s	22.8	26.7		0.6	
$\frac{1}{5}(T_m - T_s)$	25.3	29.8		12.9	
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	4 48.3	1 12.1	4 8.7	4 62.2	4 15.1
C	2.9	43.7	34.6	29.3	47.9
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	15	52	25	40	
App. z					
log a′					
A′ log β					
λ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Mar 28 1872 Observer WAR Barom. = log B =

n Recorder WAR, Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	× S Ursæ Min	× ζ Ursæ Min.	53 Ursæ Min	× 57 Draconis	α Camelop.
	18 13	6 30	× ×	Red 6 41	6 39 ××
T_δ	6 10 39 6 10 18.6	6 ~~33 12.5~~ 6 ~~33 5.8~~	33 12.5 33 5.8	6 35 4.3 6 35 22.0	39 2.0
T_m	10 38.2	~~30 13 15.4~~ 30 9.3 6.7	15.4 6.7	35 46.0	4.1
T_e	11 13.0 17 22.6	29 50.6 18.3 10.1 8.0	18.3 8.0	36 29.1	6.3
T_f	12 22.1	52.6 29.4 11.0	24.1	37 54.4	10.6
T_g	12 56.6	54.8 27.0 30 10.13	27.0	38 37.9	12.7
T_h	13 32.1	59.0 30.0	30.0		14.9
Sum	14 6.0	30 112 32.8	32.8		17.0
Mean	14 41.4	34 35.7	35.7		19.1
Red. to T_m	15 50.7	5.5 41.4	41.4		23.4
Sum = s	16 25.9	7.6 44.4	44.4		25.6
$\frac{1}{5}(T_m - T_s)$	17 6.0	11.8	47.3		27.7
T	33 34.3 13 31.5	14.0			
RA		16.1 36.6			
RA — T		30 3.3			
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	0 29.7	0 4.4 2 24.2	0 0.5	0 5.7	
C	0.3	33.1 4.8	−24.7	−24.5	
Sum	30.0	9.5 29.0			
Mean	0 15.0	59 48.5 2 14.5			
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	0	8 0	45	10	
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Mar 28 | Observer | Barom. = | log B =
n | Recorder | Att. Therm. = | log T = _____ log γ
Ex. Therm. = | log β =

Star.	58 Aurigæ	25 Lyncis	κ Hya Maj	02 Mus Maj
T_δ	6 41 — 41 27.3	45 31.2 45	19.0 5 5 54	28.8 58 19.0 58 12.6
T_m	14.2	35.2	20.7	30.0 24.4 14.0
T_e	17.0	35.2	22.3	31.1 80.1 15.8
T_f	22.6	47.0	31.7 54	29.97 40.6
T_g	25.3	51.0	34.8 31	46.0 0 8.0
T_h	28.1	53.0	37.8 30	51.8 9.1
Sum	30.8	58.9	40.8 30	57.0 10.8
Mean	33.6	3.0	43.9 31	3.7
Red. to T_m	39.1	10.8	18.9 0	13.4
Sum = s	42.0	14.8	37.8 20	18.7
$\frac{1}{5}(T_m - T_s)$	44.7	18.7	58	24.3
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	2 53.6	3 40.2	3 52.3	4 54.3 3 37.6
C	29.7	12.7	23.9	24.6 27.0
Sum			76.2	
Mean			3 38.0	
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	25	45	40	40
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date Mar 28 | Observer | Barom. = | log B =
Att. Therm. = | log T = _____ log γ
n | Recorder | Ex. Therm. = | log β =

Star.	× 1 H Draco	× d 24 Ursæ Maj	× β Cassp.	42 Lyncis	× α Ursæ Maj
	Bz	Bz	Bz	Bz	Bz
T_δ	9 19 59.8 21	9 23 — 22	29 27 6.6 26	** 30	9 42 41 51.1
T_m	14.2	22.7	35.6 12.4	23.0	18.1 52.7
T_e	28.8	29.0	39.0 18.5	26.0	19.3 54.1
T_f	57.9	41.0	30.5	1.6	41 28.7
T_g	12.9	47.5	36.6 27 29.7	4.5	33.8
T_h	26.8	53.9	42.5 32.1	7.0	38.0
Sum	41.4	59.9	48.4 35.7	9.8	42.0
Mean	56.6	5.8	54.5	12.5	46.9
Red. to T_m	25.6	18.0	6.7		
Sum = s	40.4	24.3	12.6		
$\frac{1}{5}(T_m - T_s)$	55.0	30.6	18.7		
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	1 1.1	0 28.1	0 25.0 0 8.8	4 20.8	4 6.9
C	27.4	−2.0	−10.0 28.0	15.3	8.0
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	50	0	25	30	40
App. z					
log a′					
A′ log β					
λ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Apr. 4 1872 Observer W.R. Barom. = log B =
Att. Therm. = log T = _____ log γ
n Recorder W.C.R. Ex. Therm. = log β =

Star.	× Bd 2 Gem.	× Bd α Can Min	× Bd β Gem.	× Bd 1374
	7 21	7 33	7 38	7 45
T_δ	7 20 23.2 20	17.1 32 8.9 32	1.4 37 0.1 36	49.4 34 35.5
T_m	25.6	18.1 11.0	2.4 2.4	50.4
T_e	28.0	19.1 13.1	3.4 4.8	51.6
T_f	32.9	17.1	9.3	44 19.6
T_g	35.3	19.2	11.7	27.0
T_h	37.8	21.3	14.0	34.7
Sum	40.2	23.4	16.4	42.2
Mean	42.6	25.4	18.3	50.0
Red. to T_m	47.6	29.6	23.5	
Sum = s	49.9	31.7	25.8	
$\frac{1}{b}(T_m - T_s)$	52.4	33.8	28.1	
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	1 17.9	4 60.2	3 34.4	3 26.3
C	53.2	41.9	8.8	59.6
Sum				
Mean t				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	20	45	0	5
App. z				
log a'				
A' log β				
λ' log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date Apr. 4 1872 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

	Star.	× Bo	ν Ursæ Min								ι Aquilæ B 2							
											19 Aquilæ							
											7 Y 8 2							
T_δ		7	~~44~~ 49		46	54.2	8	1	37.8	8	1	38.8						
T_m									40.0			33.7						
T_e									42.2			34.8						
T_f			48	22.4					46.8									
T_g				10.2					49.1									
T_h				2.2	52	15.1			57.3									
Sum				48.6					53.5									
Mean				42.2					55.7									
Red. to T_m									1.3									
Sum = s									2.6									
$\frac{1}{5}(T_m - T_s)$									4.8									
T																		
RA																		
RA — T																		
— n tang δ																		
ΔT + m																		
$T_m - T_\delta$																		
A		4	32.2		4	39.1			200 S.									
C			1.3			7.2												
Sum																		
Mean																		
Red. for runs																		
Red. to hor. wire																		
Red. to meridian																		
Division error																		
Sum																		
Pointer		15																
App. z																		
log a′																		
A′ log β																		
λ′ log γ																		
log tang z																		
log r																		
r																		
z																		
ϕ — z = δ (O)																		
δ (C)																		
δ (C — O)																		

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1872phae.proj.1441R

Date Apl. 10 1872 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	† α Can. Min. Bd	† β Gem. Bd	† Gr. 1374 Bd	† γ Pup. Min. Bd
T_δ	7 33 32 34.7	7 38 37 1.4 37 16.8	17 45 44	19 49 48 56.0 52 25.8
T_m	35.7	3.7		59.1
T_e	36.7	6.1		61.6
T_f	32 18.4	10.8	20.7	48 32.2
T_g	20.6	13.1	28.5	50 20.6 56 7.5
T_h	22.6	15.5	35.7	52 10.3
Sum	24.7	17.7	43.6	53 57.7
Mean	26.7	20.1	51.3	55 45.6
Red. to T_m		24.8		
Sum = s		27.1		
$\frac{1}{5}(T_m - T_s)$		29.4		
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A		3 2.8	3 37.9	4 35.0 4 41.8
C		45.2	16.6	10.2 15.0
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer		0	5	15
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date Apr. 10 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	† κ Cephei Bz	† o Ursæ Maj. Bz	† π Cancri Bz	† δ Cancri Bz
	20 13	8 20	8 26	8 38
T_δ	8 11 59.5	11 50.0 18 58.2	18 40.7	24 8 8 37 25.3
T_m	8.2	2.3	43.1	26.1
T_e	18.4	6.5	46.0	27.2
T_f	36.6	15.1		
T_g	46.1	19.2		
T_h	55.8	23.7		37 11.4
Sum	5.3	27.9		13.7
Mean	14.5	32.2		15.9
Red. to T_m	33.0	40.7		20.2
Sum = s	42.9	45.1		22.4
$\frac{1}{5}(T_m - T_s)$	51.9	49.3		20.6
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	8 58.2	0 1.9	0 51.8	4 57.4 8 5.8
C	34.6	58.3	87.1	27.2 31.2
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	40	15	30	15
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date Apr. 11 Observer W.R. Barom. = log B =
n Recorder J.M. Att. Therm. = log T = _____ log γ
Ex. Therm. = log β =

Star.	† λ Ursæ Min. Bon		† κ Cephei Bon		† o Ursæ Maj Bon		† η Cancri Bon	
	7 49		20 13		8 20		8 26	
T_δ	8 1 29.1		11 59.5	11 44.1	18 58.2	18 43.6	24 52.3	24 44.8
T_m			8.8	47.5	2.6	45.8	54.5	46.0
T_e			18.8	52.0	6.8	47.7	56.7	47.0
T_f			37.3		15.4		4.1	
T_g			46.3		19.6		8.3	
T_h			56.3	14 21.0	23.8		5.6	
Sum	7 55		5.1		28.3	19 39.6	7.8	25 18.3
Mean	46.7		14.7		32.6		10.0	
Red. to T_m	—		33.2		40.7		14.3	
Sum = s	8 1 14.8		43.3		45.2		16.6	
$\frac{1}{5}(T_m - T_s)$	3 2.8		53.7		49.6		18.8	
T								
RA								
RA — T								
— n tang δ								
ΔT + m								
$T_m - T_\delta$								
A	4 61.0		4 8.0	4 34.2	0 24.3	4 5.5	0 5.9	0 19.8
C	8.8		40.9	7.3	1.9	28.5	41.1	4.3
Sum								
Mean								
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer	15		40		15		30	
App. z								
log a′								
A′ log β								
λ′ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

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1872phae.proj.1441R

Date Apr. 11 Observer W. H. K. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder J. M. Ex. Therm. = log β =

Star.	† S Cancri Bz			† μ Ursæ Maj			† 36 Ursæ Maj			† 37 Ursæ Maj		
	8 38			10 15			10 23			10 27		
T_δ	—	37	34.6	14 13.2	14	6.9	21 51.4	21	42.6	26 19.6	26	5.7
T_m	—		32.7	16.0		8.6	55.2		44.3	23.4		7.5
T_e	—		34.1	18.7		9.9	58.7		46.7	27.3		9.6
T_f	—			24.3	14	28.14 8.47	6.3	21	13.6 44.53	35.0	26	22.8 7.60
T_g	37 9.4			27.1			9.7			38.8		
T_h	11.8			29.8	14	52.3	13.7	22	37.5	42.7	27	0.7
Sum	14.0			32.8		55.0	17.5		38.8	46.4		2.8
Mean	16.2			35.5		56.7	21.2		40.2	50.4		4.1
Red. to T_m	10.6			41.1	14	14.0 5467	28.7	22	116.5 35.83	58.1	27	7.6 2.58
Sum = s	22.7			43.9			32.6			1.9		
$\frac{1}{5}(T_m - T_s)$	24.9			46.7			36.3			5.9		
T				329.13 14 29.33			13.5 13.22 22			46.95 26 42.68		
RA												
RA — T												
— n tang δ												
ΔT + m												
$T_m - T_\delta$												
A	0 12.6			0 13.3	4	2.69	0 49.2	0	2.0	4 36.8	3	0.87
C	0.69			5.33		8.2	24.0		49.0	13.1		36.1
Sum				66		351	752		1110	499		948
Mean				0 3.30	4	17.55	0 37.60	4	55.50	4 24.95	3	47.40
Red. for runs												
Red. to hor. wire												
Red. to meridian												
Division error												
Sum												
Pointer	45			18		10	45		45	30		35
App. z												
log a′												
A′ log β												
λ′ log γ												
log tang z												
log r												
r												
z												
ϕ — z = δ (O)												
δ (C)												
δ (C — O)												

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Date Apl. 30 1872 Observer ZRR Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder J M Ex. Therm. = log β =

Star.	+ η Ursæ Maj Bz	+ α Ursæ Maj Bz	32 Ursæ Maj Bz	+ λ Ursæ Maj Bz
	10 1	10 2	11	10 10
T_δ	10 0 6.9	1 5.1	7 55.6	9 7.7
T_m		6.0	57.6	
T_e		6.9	57.5	
T_f	10 0 8.4	10 1 20.6	8 25.0	9 8.3
T_g	10.6	22.7	30.2	11.1
T_h	12.7	24.8	35.1	14.0
Sum	14.9	26.9	40.0	16.8
Mean	17.0	29.0	45.1	19.6
Red. to T_m				
Sum = s				
$\frac{1}{6}(T_m - T_s)$				
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	0 18.0	2 45.8	4 20.0	6 20.2
C	6.8	38.7	59.9	4.8
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	80	45	95	50
App. z				
log a'				
A' log β				
λ' log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date Mar. 30 1872 Observer W.H.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder J.M. Ex. Therm. = log β =

	Star.	β Leo.	ν Ursæ Maj	31 Leo Min	q Draco.
		Bz	Bz	Bz	Bz
		10 X	10 15	10 21	10 24
T_δ		10 12 33.3	12 29.0 14 17.0	14 13.7 20 4.9	19 8.3 23 10.3 22 54.0
T_m		55.5	29.7 19.7	14.7 7.4	58.2 18.9 58.5
T_e		37.7	30.6 22.6	15.9 10.0	59.3 27.7 6.2.6
T_f		42.1	28.1	15.2	45.1
T_g		44.4	30.9	17.9	54.0
T_h		46.4	33.7	20.4	2.7
Sum		48.7	36.5 14 58.5	23.0	11.5
Mean		51.0	39.2 59.1	25.7	20.4 24 35.8
Red. to T_m		55.3	44.7 60.0	30.9	37.8 41.5
Sum = s		57.5	47.6	33.4	46.1 44.6
$\frac{1}{5}(T_m - T_s)$		59.7	50.4	36.0	55.2
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A		4 8.1	0 8.1 4 29.7	1 58.9	1 1.0 1 25.5
C		58.2	58.9 10.8	41.5	38.8 7.8
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer		50	15 10	0 0	0
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date Apr. 30 Observer J.A.R. Barom. = log B =

n Recorder J.M. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	† β Virginis	† γ Ursæ Maj	67 Ursæ Maj
T_δ	11 11 44	11 11 47	11h ??XX? 55 12.055
T_m			14.8
T_e			17.7
T_f			21.3
T_g			26.3
T_h			29.1
Sum			32.0
Mean			34.8
Red. to T_m			40.6
Sum = s			43.4
$\frac{1}{6}(T_m - T_s)$			46.2
T			
RA			
RA — T			
— n tang δ			
ΔT + m			

$T_m - T_\delta$												
A	3	26.9	4	36.1	4	10.9	3	28.2	4	49.9	4	12.8
C		12.0		16.9		51.9		12.2		24.9		47.1
Sum												
Mean												
Red. for runs												
Red. to hor. wire												
Red. to meridian												
Division error												
Sum												
Pointer	50		55				35		0			
App. z												
log a′												
A′ log β												
λ′ log γ												
log tang z												
log r												
r												
z												
φ — z = δ (O)												
δ (C)												
δ (C — O)												

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1872phae.proj.1441R

Date May 20 1872 Observer W.A.R.

n Recorder J.M.

Barom. = Att. Therm. = Ex. Therm. =

log B = log T = log β =

log γ

Star.	× η Ursæ Maj	+ 10 Draconis	× ζ Ursæ Maj	× η Ursæ Maj	× 10 Draconis
	8 Cephei	B Leo.			
T_δ	33 27.6	11 42 13.4	11 42 9.0	40 39.4	47 0.8
T_m	31.0	15.6	10.0	42.8	
T_e	33.0	17.7	11.0	46.3	
T_f	16.6	22.0		53.5	
T_g	33.20	24.0		56.9	
T_h	23.5	26.2		0.6	
Sum	27.2	28.3		4.0	
Mean	32.0	30.5		7.6	
Red. to T_m	27.57	34.7		14.0	
Sum = s		36.9		18.2	
$\frac{1}{5}(T_m - T_s)$		31.0		21.7	
T					
RA					
RA — T					
— n tang δ					
ΔT + m					

	η Ursæ Maj				10 Draconis			
	13 43				13 48			
T_δ	13 42 6.4	41 58.2	47	47 4.8				
T_m	9.5	59.5		6.1				
T_e	12.7	61.0		7.7				
T_f	19.1	178.7 59.57		18.6 6.20				
T_g	22.4	41	28.4	47				
T_h	25.5		33.6					
Sum	28.7	42 48.5	38.6					
Mean	31.9		43.5					
Red. to T_m	38.3		48.5 192.6					
Sum = s	41.5		47 38.52					
$\frac{1}{5}(T_m - T_s)$	44.7							
T	42							
RA								
RA — T								
— n tang δ								
ΔT + m								

$T_m - T_\delta$																		
A	4	10.6	4	27.7	0	21.1			8	26.0			1	4.3	0	22.1	2	3.5
C		58.4		10.2		14.6				12.1				49.5		8.6		45.3
Sum		4.0		37.9										114.2		30.7		1088
Mean	4	2.00	4	18.95									0	57.10	0	15.35	1	54.40
Red. for runs																		
Red. to hor. wire																		
Red. to meridian																		
Division error																		
Sum																		
Pointer	15				5				55				025				0	22
App. z																		
log a′																		
A′ log β																		
λ log γ																		
log tang z																		
log r																		
r																		
z																		
ϕ — z = δ (O)																		
δ (C)																		
δ (C — O)																		

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1872phae.proj.1441R

Date May 22 1872 Observer E.S.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder C.M. Ex. Therm. = log β =

Star.	+ ζ Bootis			+ ι Virginis			× α Draco		
	13 49			13 55			14 1		
T_δ	48 17.4	48 12.6		55 35	54 57.7		14 0 28.8	14 0 16.9	
T_m	19.6			5.8	58.7		28.1	18.2	
T_e	21.8			8.2	59.7		33.2	20.0	
T_f	26.2			12.8	54 58.70	26.1	42.8	0 18.37	55.1
T_g	28.3			15.1			47.6		
T_h	30.5	48 57.6		17.5			52.7	1 18.6	
Sum	32.7	58.6		19.5			57.6		
Mean	34.9	59.2		22.2			2.4		
Red. to T_m	35.2	48 58.47	26.4	26.8			12.0		
Sum = s	41.4			29.2			16.9		
$\frac{1}{5}(T_m - T_s)$	43.6			31.5			21.7		
T	48 30.57	33 5.6		55 17.49	19.24		0 52.54	57.53	
RA									
RA — T									
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A	0 20.1	4 25.0		2 34.7			4 10.1	3 36.8	
C	11.0	15.8		23.8			58.6	20.1	
Sum	31.1	40.8		58.5			3.7	56.9	
Mean	0 15.55	4 20.40		2 29.25			4 1.85	3 28.45	
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	20	15		20			20		
App. z									
log a′									
A′ log β									
λ′ log γ									
log tang z									
log r									
r									
z									
ϕ — z = δ (O)									
δ (C)									
δ (C — O)									

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1872phae.proj.1441R

Date June 3 1872 Observer D.P.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder J.M. Ex. Therm. = log β =

Star.	× β Virginis	× 17 Com Ber.	× Polaris	× ζ Ursæ Maj.
	13 3 −4 52	184 +39 10	1 13 +88 39	13 19 +55 35
T_δ	13 2 58.0	2 52.5 3	4 3 58.2	78 45.0 13
T_m	0.0	53.6	58.5	9 45.0
T_e	2.0	54.5	60.7	11 12.6
T_f	6.1	2 53.53	3 57.13	12 36.4
T_g	8.2			14 6.12
T_h	10.2			11 9.02
Sum	12.3		4 (18.6)	
Mean	14.4	42.2		
Red. to T_m	18.6	45.0		
Sum = s	20.6	50.4	1.04	
$\frac{1}{5}(T_m - T_s)$	22.7	5.0	0.98	
T	3 10.28	55.6	0.92	11 9.04
RA			0.98	
RA − T				
− n tang δ				
ΔT + m				

$T_m - T_\delta$												
A			3	39.7		0	05.7		2	7.8	1	29.4
C				28.9			87.4			05.8		11.4
Sum				68.6			93.1			1.6		44.8
Mean			3	34.30		0	46.55		2	0.80	1	22.40
Red. for runs												
Red. to hor. wire												
Red. to meridian												
Division error												
Sum												
Pointer			5			0			45			
App. z												
log a′												
A′ log β												
λ′ log γ												
log tang z												
log r												
r												
z												
ϕ − z = δ (O)												
δ (C)												
δ (C − O)												

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1872phae.proj.1441R

Date June 9 1872 Observer A.D.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder A.M. Ex. Therm. = log β =

Star.	× ξ Ursæ Maj	× 12 Camelop.	× ξ Draconis	× 17 Camelop.
	12 49 +56 38	12 50 +39 0	12 56 +11 38	13 4 +39 10
T_δ	12 47 49.77 37.8	49 ++ 49	57.2 56 23.7 3	42.83 34.8
T_m	53.3 40.0	34.4 37.1 27	25.8	45.5 35.9
T_o	57.4 40.9	40.0 29	28.0	48.1 36.8
T_f	4.7 47 39.57	45.2 52	32.2	53.3 3 35.83
T_g	8.5	48.0 28	34.2	56.0
T_h	12.2	50.6 26	38.3	58.6 4 8.0
Sum	16.0	53.2 26	38.4	1.4 8.8
Mean	19.5	55.8 26	40.4	4.0 10.0
Red. to T_m	27.1	1.1 53	44.7	9.4 4 5.93
Sum = s	30.9	3.7 26	46.8	12.0
$\frac{1}{5}(T_m - T_s)$	34.7	6.4 27	49.0	14.6
T	48 12.18 12.182	555.5 49 57.50	55 36.32 3	58.70 56.700
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	8 37.1 2 50.1 1 35.9		01	56.5 1 20.9
C	25.2 37.1 25.7		10	46.8 12.9
Sum	62.3 87.2 61.6			103.3 33.8
Mean	3 31.15 2 43.60 1 30.80		1	51.65 1 16.90
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	4.8	20	10	
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date June 9, 1872 Observer W.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder J.M. Ex. Therm. = log β =

Star.	× 43 Comae			× Polaris			× Gr. 2164			× P14 221		
	13 6	+43 21		1 13	+88 39		14 48	+59 48		14 50	+14 57	
T_δ		28.1 5	21.8			9.0	47	36.8 47	25.3	49	46.5 49	52.2
T_m		30.4	22.7					40.9	26.6		48.6	53.2
T_e		32.7	23.9 8.4					45.0	28.2 29.1		50.8	54.2 2.6
T_f		37.3 5	22.80					53.0 47	26.70		55.0 49	53.20
T_g		39.7		8	18.2 13	49.0		56.2			57.2	
T_h		42.1 6	1.1	9	43.4 25.2			1.2			59.3 50	31.9
Sum		44.4	2.2	11	8.4 23.0			5.5 48	21.0		1.5	32.8
Mean		46.7	3.3	12	36.3 27.9			9.6			3.6	33.7 8.4
Red. to T_m		51.4 6	6.6 2.20	14	0.0 23.7			17.7			7.8 50	32.80
Sum = s		53.8		54	106.3			21.7			10.0	
$\frac{1}{5}(T_m - T_s)$		56.2						25.8			12.2	
T		42.07 ~~42.073~~		11	9.26		48	1.22 ~~1.215~~		49	59.32 ~~59.318~~	
RA												
RA — T												
— n tang δ												
ΔT + m												
$T_m - T_\delta$												
A	0	52.9	8.1	4	10.8	3 36.0	4	10.8	3 36.0	4	11.9	3 22.7
C		42.1	5.7	0	54.5 57.6	37.1 21.9		57.6	21.9		6.6	16.5
Sum		95.0	6.8					8.5	57.9		18.5	39.6
Mean	0	47.50	3.40				4	4.25	3 28.95	4	9.25	3 19.80
Red. for runs												
Red. to hor. wire												
Red. to meridian												
Division error												
Sum												
Pointer	50			0 30			30		20	20		
App. z												
log a′												
A′ log β												
λ′ log γ												
log tang z												
log r												
r												
z												
ϕ — z = δ (O)												
δ (C)												
δ (C — O)												

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Date Jan 9 1872 Observer D.P.R. Barom. = log B =
Att. Therm. = log T = _____ log γ
n Recorder J.M. Ex. Therm. = log β =

Star.	+ 2 Aeq. Dis. Min.				+ β Bootis				+ η Bootis				+ β Librae			
	14 56	+66	26		14 57	+40	53		14 59	+27	26		15 10	−8	55	
T_δ	52.8	54			46.2	56			40.3	56		31.2	32.4	58	32.8	9
T_m	58.0				48.3				42.8			32.8	34.8			
T_e	3.0				51.2				45.5			34.0	37.0			
T_f	13.4	54			48.5				51.1	56		32.67	41.8			
T_g	18.7								53.9				44.0			
T_h	23.7 28.8								56.5				46.3			
Sum	33.7								59.2			15.1	48.7			
Mean	44.1								1.9			15.8	51.0			
Red. to T_m	49.4								7.4			15.45	55.7			
Sum = s	54.7								10.1				57.9			
$\frac{1}{5}(T_m - T_s)$	23.69								12.7				0.3			
T	23.697							52	56.49 56.491				46.35 46.355			9
RA																
RA — T																
— n tang δ																
ΔT + m																
$T_m - T_\delta$																
A	1	34.0			4	1.0	3	17.9	0	34.3			1	10.2	0	21.1
C		19.5				5.9		8.9		26.1				7.7		20.1
Sum		53.5				11.9		26.8		60.4				17.9		1.2
Mean	1	26.75			2	55.95	3	13.40	0	30.20			1	8.95	0	.2060
Red. for runs																
Red. to hor. wire																
Red. to meridian																
Division error																
Sum																
Pointer	55				25				55				15			
App. z																
log a′																
A′ log β																
λ′ log γ																
log tang z																
log r																
r																
z																
ϕ — z = δ (O)																
δ (C)																
δ (C — O)																

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1872phae.proj.1441R

Date June 9 1872 Observer N.S.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder J.H. Ex. Therm. = log β =

Star.	+ 1 Hel. Ursæ Maj	+ α Boötis	+ 1 Hel. Ursæ Maj	+ ζ Ursæ Maj
T_δ	15 13 +67 49 12 28.7 12 19.7	15 20 +37 49 19 12.4 18 59.3	15 21 +72 17 20 34.9 20 14.0	
T_m	34.2 23.2	15.2 0.7	42.0 71	
T_e	39.8 25.4 68.3	18.0 2.2 2.7	48.6 66 7.0	
T_f	51.0 ~~25.7~~ 22.77 12	23.1 19 11.73	55.6 21	54.0
T_g	56.0	25.6	2.3 67	58.7
T_h	1.7	28.2		58.7
Sum	6.7 13 44.4	30.8	21	14.4 56.47
Mean	12.2 46.8	33.4		
Red. to T_m	23.4 47.0 20.2	38.6		
Sum = s	28.8 13 46.73	41.2		
$\frac{1}{5}(T_m - T_s)$	13 34.4	44.0		
T	~~1.61~~ ~~1.609~~	19 28.25 ~~28.255~~	20 48.68	
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	3 ~~10.9~~ 11.9 2 32.1	3 ~~11.9~~ 10.9 2 ~~3.21~~	0 ~~4.80~~ 0	~~0.85~~ 8.5
C	~~1.9~~ 5.7.0 15.1	~~8.70~~ 1.9 4.7	3.52	54.9
Sum	8.9 47.2	12.8	84.2	3.4
Mean	3 4.45 2 23.60	3 6.40	0 42.10 0	1.70
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	30	30	5	
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date June 11/1872 Observer W.A.R.

n Recorder S.M.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T = _____ log γ
log β =

	Star.	× 12 Cam. Ber.	× 2 Virginis	× ? i Virg.	× 17 Cam. Ber.
T_δ		12 50 +39 0	12 56 +11 38	13 3 −4 52 14 9 −5 24	13 4 +39 10
T_m					
T_e					
T_f					
T_g					
T_h					
Sum					
Mean					
Red. to T_m					
Sum = s					
$\frac{1}{b}(T_m - T_s)$					
T					
RA					
RA − T					
− n tang δ					
ΔT + m					
$T_m - T_\delta$					
A		2 100	3 31,2	2 46,0 3 25,8	1 35,8
C		06	25,9	28,8 21,8	30,1
Sum		106	57.1	85.9 47.7	99
Mean		2 530	3 28.55	2 42.95 3 23.85	1 34.95
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer		25	45	15	15 45
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ − z = δ (O)					
δ (C)					
δ (C − O)					

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1872phae.proj.144R

Date June 11 Observer W. A. R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder J. M. Ex. Therm. = log β =

Star.	† 43 Comae	† Polaris	a Virginis XX	† Gr. 2164	† β Ursæ Min.
	13 6 +43 21	1 13 +88 39		14 48 +59 48	14 51 +74 40
T_δ					
T_m					
T_e					
T_f					
T_g					
T_h					
Sum					
Mean					
Red. to T_m					
Sum = s					
$\frac{1}{5}(T_m - T_s)$					
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	1 47 0 14.9	0 58.1	1 1.1 1 26.0	4 12.1	2 40.9 14
C	54.3 (4)° 6.1	43.9	52.7 25.3	57.1	26.1 55
Sum	1190 ~~81.0~~ 2	1050	0.8 113	11.2	670 14.0
Mean	0 59.50 ~~40.50~~ 2	0 52.50	1 0.40 1 25.65	4 5.60	2 33.50 2 7.00
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	5.5	0	5.5	3.5	4.5
App. z					
log a′					
A′ log β					
λ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.144R

Date June 11 Observer D.W.R. Barom. = log B =
n Recorder J.M. Att. Therm. = log T = _____ log γ
Ex. Therm. = log β =

Star.	† 2 Ser. Ins. Mic	† β Boötis	† δ Boötis	† ε. Boötis
	14 56 +66 26	14 57 +40 53	15 10 +33 47	15 26 +41 16
T_δ				
T_m				
T_e				
T_f				
T_g				
T_h				
Sum				
Mean				
Red. to T_m				
Sum = s				
$\frac{1}{5}(T_m - T_s)$				
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	0 57.9	4 9.8	0 15.2	1 39.1
C	36.9	51.1	7.9	29.1
Sum	888	9.0	23.1	68.2
Mean	0 44.40	4 4.50	0 16.55	1 34.10
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	10	20	40	40
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.144TR

Date June 19 1872 Observer W.H.R.

n Recorder J.M.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T = _____ log γ
log β =

	Star. † ζ Ursæ maj	† π Bootis	† α Draco	† δ Bootis	† ζ Ursæ Min
	13 43 +49 56	13 49 +19	2 14 1	+64 58	14 5 +25 41	14 9 +78 8
T_δ					
T_m					
T_e					
T_f					
T_g					
T_h					
Sum					
Mean					
Red. to T_m					
Sum = s					
$\frac{1}{5}(T_m - T_s)$					
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	0 43 0	0 6.9	3 5 29	3 24.1	0 41.1	39.1	4 34.1
C	31.8	63.7	41.8	12.8	84.3	81.9	29.1
Sum	74.8	10.6	94.7	36.9	75.4	71.0	63.2
Mean	0 37.40	0 5.30	3 47.35	3 18.45	0 37.70	35.50	4 31.60
Red. for runs							
Red. to hor. wire							
Red. to meridian							
Division error							
Sum							
Pointer	30	25	25		45		15
App. z							
log a′							
A′ log β							
λ′ log γ							
log tang z							
log r							
r							
z							
ϕ — z = δ (O)							
δ (C)							
δ (C — O)							

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1872phae.proj.144R

Date June 19/1872 Observer D.P.R.

n Recorder J.M.

Barom. = log B =

Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	× i Bootis	× θ Bootis	12 Herc. Pol. ××	× ζ Ursæ Min	× Gr. 2296
	14 12 +51 57	14 21 +52 26		15 49 +78 11	1555 +55° 6
T_δ					
T_m					
T_e					
T_f					
T_g					
T_h					
Sum					
Mean					
Red. to T_m					
Sum = s					
$\frac{1}{b}(T_m - T_s)$					
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	0 86.8	4 45.1 1 27.0	37.2	3 32.1 3 10.6	1 23.5
C	25.9	36.0 18.8	27.9	20.9 59.0	42 11.9 4.1 13.0
Sum	6 27	81 1 45.8	65.1	53.0 9.6	4.1 10.9 36.5
Mean	0 31.35	4 40.55 1 22.90	32.55	3 26.50 3 4.80	2 11.50 1 5.50 1 18.25
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	30	0	25		15 20
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date June 30 1872 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder J.F.M Ex. Therm. = log β =

	Star. × Dr. 2164	47 b Cephei.	× β Cas. Min.	66 Nela Ursa Min	× β Bootis
	14 48 +59 48		14 51 +74 40		14 57 +40 53
T_δ	14 47		14 51		
T_m					
T_e					
T_f					
T_g					
T_h					
Sum					
Mean					
Red. to T_m					
Sum = s					
$\frac{1}{5}(T_m - T_s)$					
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	3 47.0	3 39.3	2 25.8	1 8.7 −0.3	3 62.7
C	40.4	24.0	17.5	59.7	57.0
Sum	8.4	5.83	43.3	8.4	0.7
Mean	3 47.20	3 29.15	2 21.65	1 4.20	4 0.35
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	35	20	45	0	20
App. z					
log a′					
A′ log β					
λ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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1872phae.proj.1441R

Date June 30 1872 Observer Z.A.R. Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder J.F.M. Ex. Therm. = log β =

	Star.	† 7 Ursæ Min	† 12 Draconis	† 2 Draconis	Ursæ Min + Herculis	† π Herculis
		7 Ursæ Min				
T_δ		15 13 +67 49	15 45 +62 59	16 22 +61 48	17 9 +14 32	17 11 +36 57
T_m						
T_e						
T_f						
T_g						
T_h						
Sum						
Mean						
Red. to T_m						
Sum = s						
$\frac{1}{b}(T_m - T_s)$						
T						
RA						
RA — T						
— n tang δ						
ΔT + m						
$T_m - T_\delta$						
A		2 44.4	3 24.0	4 30.8	0 12.2	0 29.6
C		35.3	15.1	22.2	10.0	28.2
Sum		80.0	39.1	53.0	22	128
Mean		2 40.00	3 19.55	4 26.50	0 11.10	0 26.40
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer		35	25	35	55	30
App. z						
log a′						
A′ log β						
λ log γ						
log tang z						
log r						
r						
z						
ϕ — z = δ (O)						
δ (C)						
δ (C — O)						

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1872phae.proj.144R

Date Sept 30 1872 Observer N. & R.

n Recorder J. F. M.

Barom. = Att. Therm. = Ex. Therm. =

log B = log T = log β = log γ

Star.	XX Gr. 966	* B Draco	* D, L₂ Draco	* i Herculis	* Boph.
		17 28 +52 24	17 30 +55 16	17 36 +46 4	17 37 +4 37
T_δ					
T_m					
T_e					
T_f					
T_g					
T_h					
Sum					
Mean					
Red. to T_m					
Sum = s					
$\frac{1}{5}(T_m - T_s)$					
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	1 10.3	4 17.1	2 0.0 2 0.0	3 28.0	4 44.4
C	58.1 −1.9	9.5	50.9 −9.1	50.9 −9.1	21.8 42.3
Sum	8.4	26.6	110.9	110.9	9.8 6.7
Mean	1 4.20	4 13.30	1 55.45	1 55.45	3 24.90 4 43.35
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	25	0	10	10	20 45
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

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Date July 6 1872 Observer W.A.R. Barom. = log B =
n Recorder J.F.M. Att. Therm. = log T = _____ log γ
Ex. Therm. = log β =

	Star.	× 2 76 Ursæ Min.	× β Bootis	× γ Bootis	×× 48 76 Capr.	× 3 Serpent.
T_δ		14 56 +76 26	14 57 +40 53	14 59 +27 26		15 9 +5 24
T_m						
T_e						
T_f						
T_g						
T_h						
Sum						
Mean						
Red. to T_m						
Sum = s						
$\frac{1}{b}(T_m - T_s)$						
T						
RA						
RA — T						
— n tang δ						
ΔT + m						
$T_m - T_\delta$						
A		1 36.7	4 3.2	0 48.7	4 31.1	2 1.7
C		26.1	59.4	44.1	19.0	18.0
Sum		6 28	2,6	123	501	4
Mean		1 31.40	4 1.30	0 46.15	4 25.05	2 18.35
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer		0	30	0	40	0
App. z						
log a′						
A′ log β						
λ′ log γ						
log tang z						
log r						
r						
z						
ϕ — z = δ (O)						
δ (C)						
δ (C — O)						

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Date July 6 1872 Observer W.A.R.

n Recorder J. M.

Barom. = Att. Therm. = Ex. Therm. =

log B = log T = log β =

log γ

Star.	† 21 Bootis	† ε Herculis	† Gr. 2415	† α Herculis	† π Herculis
	15 26 +41 16	16 59 +32 14	17 4 +40 41	17 9 +14 32	17 11 +36 57
T_δ					
T_m					
T_e					
T_f					
T_g					
T_h					
Sum					
Mean					
Red. to T_m					
Sum = s					
$\frac{1}{5}(T_m - T_s)$					
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	1 37.1	3 49.0	1 33.1	0 7.4	0 35.7
C	32.1	38.8	25.2	5.1	29.9
Sum	9.2	8.8	1 58.3	12.5	65.6
Mean	1 34.60	3 43.90	1 29.15	0 6.25	0 32.80
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	10	10	40	55	20
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

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Date July 6 1872 Observer AR Barom. = log B =

Att. Therm. = log T = _____ log γ

n Recorder D. M. Ex. Therm. = log β =

	Star.	Gr. 2437 **	Gr. 966 **	+ β Draconis 17 28 +52 24
T_δ				
T_m				
T_e				
T_f				
T_g				
T_h				
Sum				
Mean				
Red. to T_m				
Sum = s				
$\frac{1}{5}(T_m - T_s)$				
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A		2 5.5	1 16.5	H. R. only.
C		48.0	4.8	
Sum		106.5	21.3	
Mean		2 53.25	1 10.65	
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer		30	25	
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
ϕ — z = δ (O)				
δ (C)				
δ (C — O)				

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1872phae.proj.1441R

Date | Observer | Barom. = | log B =

Att. Therm. = | log T = _____ | log γ

n | Recorder | Ex. Therm. = | log β =

Star.

T_δ

T_m

T_e

T_f

T_g

T_h

Sum

Mean

Red. to T_m

Sum = s

$\frac{1}{5}(T_m - T_s)$

T

RA

RA — T

— n tang δ

ΔT + m

$T_m - T_\delta$

A

C

Sum

Mean

Red. for runs

Red. to hor. wire

Red. to meridian

Division error

Sum

Pointer

App. z

log a′

A′ log β

λ′ log γ

log tang z

log r

r

z

ϕ — z = δ (O)

δ (C)

δ (C — O)

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Date July 7 1872 Observer W.A.R. Barom. = log B =
Att. Therm. = log T = _____ log γ
n Recorder C.F.M. Ex. Therm. = log β =

Star.	β Ursæ Min.	2 Ursæ Min.	ρ Bootis	γ Bootis	32 Serpentis
	14 51 +74 40	14 56 +66 26	14 57 +40 53	14 59 +27 26	15 9 +5 24
T_δ					
T_m					
T_e					
T_f					
T_g					
T_h					
Sum					
Mean					
Red. to T_m					
Sum = s					
$\frac{1}{5}(T_m - T_s)$					
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	2 27.2	1 36.8	4 8.7	0 41.4	1 5.80
C	17.2	26.2	5.82 ~~1.8~~	85.9	5.74
Sum	444	630	1.9	773	154
Mean	2 22.20	1 31.50	4 0.95	0 38.65	1 57.70
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	45	0	30	0	0
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
ϕ — z = δ (O)					
δ (C)					
δ (C — O)					

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Date July 7 1872 Observer W.R.

n Recorder S.F.M.

Barom. = log B =

Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

Star.	* δ Bootis	* ε Bootis	* α Coronae	* 12 Draconis	* Draco
T_δ	15 10 +33 47	15 26 +41 16	15 29 +27 8	15 45 +62 59	16 28 +69 2
T_m					
T_e					
T_f					
T_g					
T_h					
Sum					
Mean					
Red. to T_m					
Sum = s					
$\frac{1}{5}(T_m - T_s)$					
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	0 16.5	1 32.1	0 46.2	3 5.7	3 32.2	0 35.5
C	12.9	26.9	40.2	48	23.5	25.3
Sum	94	59 0	64	3.9	357	608
Mean	0 14.70	1 29.50	0 43.20	3 1.95	3 27.85	0 30.40
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer	40	10	45	25	25	
App. z						
log a′						
A′ log β						
λ′ log γ						
log tang z						
log r						
r						
z						
ϕ — z = δ (O)						
δ (C)						
δ (C — O)						

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1872phae.proj.144MR

Date July 1872 Observer W.A.R. Barom. = log B =

n Recorder A. F. M. Att. Therm. = log T = _____ log γ

Ex. Therm. = log β =

	Star.	Gr. 2391			Elus Mir a Hercul.			Hercul. Gr. 2437			Gr. 966			β Draco		
T_δ					16	59	+82	14	179	+14	17	11	+36	17	28	+52
T_m																
T_e																
T_f																
T_g																
T_h																
Sum																
Mean																
Red. to T_m																
Sum = s																
$\frac{1}{5}(T_m - T_s)$																
T																
RA																
RA — T																
— n tang δ																
ΔT + m																
$T_m - T_\delta$																
A	4	29,3			3	53,3	0	12,9	4	62,2	2	58,5	1	21,1	4	11,2
C		19.6				41.9		13.0		57.0		48.3		8.0		2.3
Sum		489				951		5,9		1192		1068		291		13,5
Mean	4	24,45			3	47,55	0	12,95	4	59,60	2	53,40	1	14,55	4	6,75
Red. for runs																
Red. to hor. wire																
Red. to meridian																
Division error																
Sum																
Pointer	40				10			55		25		30		25		0
App. z																
log a'																
A' log β																
λ log γ																
log tang z																
log r																
r																
z																
ϕ — z = δ (O)																
δ (C)																
δ (C — O)																

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